

the city under the city: in/to the PATH

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I hereby declare that I am the sole author of this thesis. This is the true copy of the thesis, including any required final revisions, as accepted by the examiners.

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abstract

Beneath the congested sidewalks of downtown Toronto is an expanding underground pedestrian network spanning thirty kilometres, the largest urban infrastructure of its kind. Branded as the PATH, it does not provide a clear path to the major destinations it connects. It is a non-place; a labyrinth of shopping centres, each privately owned by competing developers with the intent to disorient and trap consumers within their property.

Repeated efforts by the city to promote the PATH and allow it to be read as a single entity have been thwarted by the developers whose self-interests outweigh the importance of the larger network. Inconspicuous street entrances add to the problem, preventing the PATH from becoming a viable alternative to street level sidewalks during the harsh winter months, humid summer days and the odd thundershower. Daily commuters who have memorized specific routes remain the most prevalent user group while visitors from out of town struggle to find the Eaton Centre from Union Station.

Accepting that the PATH is a collection of private spaces and not a public urban condition, this thesis explores the possibility of unifying its fragments with minimal architectural incisions that would surgically mend the system. Traversing the subterranean PATH would be facilitated by creating a permanent and legible navigation pattern within the tunnels, solving the problem of spatial orientation by intensely engaging the user's direct experience through sensory-based design. Surface pavilions would provide visible access points from street level while protrusions from the underground would open up the PATH to natural light. The goal of these strategic alterations is to achieve effective utilization of the PATH by a full spectrum of people, easing the pedestrian traffic flow through the downtown core.

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		[Attwooll, Jolyon "The Louvre attracts record visitor numbers." The Telegraph. Jan. 4, 2012, http://www.telegraph.co.uk/travel/travelnews/8993072/The-Louvre-attracts-record-visitor-numbers.html]	138		[Ibid, 101.]
134	3/029	Sectional Perspective of the Apple Store [Axis Images. "Apple Store Fifth Avenue, Virtual Tour." Accessed Feb. 14, 2015. http://axisimages.com/vviewer/AppleFifthAve/index.html]	138	3/043	Photograph of the Aerial View of Jubilee Park [Mitchell Owens. "Wirtz International's Gardens of Earthly Delight." Architectural Digest. August 2011, http://www.architecturaldigest.com/architecture/2011-08/wirtz-international-garden-retrospective-slideshow_slideshow_item02_2]
134	3/030	Glass Spiral Staircase Entrance at the Apple Store [iDesignArch: Interior Design and Architecture. "Apple Store Fifth Avenue New York." Accessed Feb. 14, 2015, http://www.idesignarch.com/apple-store-fifth-avenue-new-york/avenue-new-york/]	139	3/044	Photograph of Entrance to Canary Wharf Tube Station
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137	3/036	Photograph of West Ham Station [Kenneth Powell. <i>The Jubilee Extention</i> . (London : Laurence King, 2000), 143]			
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136	3/038	Photograph of Bermondsey Station			
136	3/039	Photograph of Bermondsey Station [Ibid, 83.]			
136	3/040	Photograph of Bermondsey Station [Ibid, 78-79.]	140	3/052	Section Drawing of the Mirrors in the Restaurant at The Hotel [Paul Felt. "Boutique property boasts architect's unique design." Travel Weekly 8 Mar. 2001: E6.
137	3/041	Map of Jubilee Line Extension [Ibid, 200.]			
138	3/042	Section Drawing of Canary Wharf Tube Station			

		Canadian Periodicals Index Quarterly.]	166	3/069	Section B-B of Light Pavilion
160	3/053	Photograph of the Restaurant in The Hotel in Lucerne [Ibid.]	166	3/070	Section C-C of Light Pavilion
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162	3/054	Section Drawing of The Fulton Center [Sherrell Dorsey. "Fulton Center Installs Stunning Daylight- Amplifying Sky Reflector-Net Diamond Web." Inhabitat, June 27, 2013, http://inhabitat.com/ nyc/wp-content/blogs.dir/2/files/2013/08/ Reflector-Net-Fulton-Center-7.jpg]	168	3/072	Section A-A of Solar Collector Trees in a Tunnel Application
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159	3/095	Photograph of Street View of Existing Simcoe Park Site			
160	3/096	Site Plan of Proposed PATH Entrance Pavilion at Simcoe Park Site	172	3/113	Site Plan of Proposed Solar Collector Trees at the First Tunnel Site
160	3/097	Rendering of Street View of Proposed Entrance Pavilion at Simcoe Park Site	172	3/114	Photograph of Aboveground View of Existing First Tunnel Site
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166	3/105	Street Section of Proposed Light Pavilion on the Plaza at First Canadian Place and at the TD Plaza Site	186	0/008	Photograph of Model of Adelaide St W Tunnel, east of Bay - with one layer of thread
168	3/106	Photograph of View of Existing TD Plaza Site	186	0/009	Photograph of Model of Adelaide St W Tunnel, east of Bay - with three layers of thread
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169	3/108	Sectional Perspective of Proposed Light Pavilion at TD Plaza Site	186	0/010	Photograph of Model of Adelaide St W Tunnel, east of Bay - one side with one layer of thread
170	3/109	Site Plan of Proposed Solar Collectors at King and Bay			





From there, after six days and seven nights, you arrive at Zobeide, the white city, well exposed to the moon, with streets wound about themselves as in a skein. They tell this tale of its foundation: men of various nations had an identical dream. They saw a woman running at night through an unknown city; she was seen from behind with long hair, and she was naked. They dreamed of pursuing her. As they twisted and turned, each of them lost her. After the dream they set out in search of that city; they never found it, but they found one another; they decided to build a city like the one in the dream. In laying out the streets, each followed the course of his pursuit; at the spot where they had lost the fugitive's trail, they arranged spaces and walls differently from the dream, so she would be unable to escape again.

This was the city of Zobeide, where they settled waiting for that scene to be repeated one night. None of them asleep or awake, ever saw the woman again. The city's streets were streets where they went to work every day, with no link any more to the dreamed chase. Which, for that matter, had long been forgotten.

New men arrive from other lands having had a dream like theirs, and in the city of Zobeide, they recognized something of the streets of the dream, and they changed the positions of arcades and stairways to resemble more closely the path of the pursued woman and so, at the spot where she had vanished, there would remain no avenue of escape.

The first to arrive could not understand what drew these people to Zobeide, this ugly city, this trap.

— Italo Calvino *Invisible Cities*

P A T H

STANDARD LIFE CENTRE



prologue

"Back in an hour!" I say to my colleagues at my new office in Metro Hall. I grab the bag with the shoes I need repaired. I found a repair place under the TD Centre through a quick Google search. Heavy rain thrashes against the windowpane. Luckily there's the PATH; I won't have to step outside.

According to Google Maps, the street level walk time is eight minutes. Add a couple of more as I'm wearing heels. Still, that should leave plenty of time to lunch at a food court.

Descending into the concourse level, I'm thrust into the rush of the lunch hour crowd that flood the PATH everyday at this time. Overwhelmed, my eyes dart around for any sign of a map. One appears in a dark corner behind a group of tourists who are as confused as I am.

I should head northeast towards St Andrew Station and then continue east to TD. Which way is north? Oh, who cares, just

follow the sea of office workers. Miraculously, I find the subway. I go straight through the Sun Life Tower.

The street exit says Adelaide Street. How did I end up at the Exchange Tower?

Backtracking, I get to First Canadian Place. I need a map. Where is the TD Centre in relation to First Canadian Place? Oh, it's just south of it.

I enter the TD Centre. I'm close. I go left then right. The corridors all look the same. The shoe repair shop is hidden toward the end of a long hallway, just off the food court.

"Come back in two to three weeks," the shoe guy says, handing me a receipt.

I look at my watch. This ordeal took thirty minutes. No time for lunch. So hungry.

Now how do I get back?

introduction

Underneath the busy sidewalks of downtown Toronto is an even busier underground pedestrian network, the largest urban infrastructure of its kind. Branded as the PATH, it does not provide a clear path to any of the major destinations it connects. Instead, it is a thirty-kilometre collection of fragmented privately owned spaces that masquerade as a climate-controlled alternative to the street level sidewalks. Its usefulness is limited to daily commuters and it is unwelcoming to those who have not learned its ways.

Being a transient space, the PATH is defined as a non-place. However, the most alienating aspects of this subterranean network are its difficulty to navigate and its obscurity to the non-commuting public. Accepting that the PATH consists of mostly privately owned spaces, this thesis explores the possibility of unifying its fragments with architectural incisions that solve the problems of spatial orientation and visibility, incrementally improving the system.

Postwar design philosophy of shopping centres had been to disorient and trap consumers within each privately owned retail space. The development of the PATH occurred at the whims of many individual designers, without an overarching vision of the PATH as a single entity. This philosophy still persists and is an impediment to spatial orientation within the space as well as to its connectivity to the surface city.

The PATH is vital to Toronto's commuter population. Each weekday morning, a hundred thousand commuters stream through Union Station via Go Transit and even more flood in from the five subway stations that are connected to the PATH. The passages allow commuters to have a predictable walk through Toronto's downtown core to their place of work.

In contrast to a similar system in Montreal called the RESO, the PATH is Toronto's "best kept secret"¹ because unlike its counterpart, it is hidden and disconnected from the street.

On the concourse level, the PATH lacks natural light and views to the exterior. Most entrances to the PATH are disguised as entrances to private buildings. Entrance pavilions are inconspicuous, preventing the PATH from becoming a viable alternative to street level sidewalks during the harsh winter months, humid summer days and the odd thundershower.

As an effort to alleviate problems of navigation, the city became the coordinating agency for the PATH in 1987. Design of a signage system was the priority to render the PATH more popular and useable to the general public. The success of its implementation was supplanted by the unwillingness of developers to prominently place and voluntarily maintain the PATH brand maps and signage.

In 2012, city planners teamed up with developers to formulate a masterplan outlining design principles to make the PATH more useful to visitors and the growing downtown population. Yet, these principles are not policy and cannot be enforced. Nothing has changed in the continuous expansion of the PATH. Navigation remains a challenge: daily commuters who have memorized specific routes avoid veering off their usual course while visitors who enter the system from Union Station struggle to find the Eaton Centre.

Traversing the PATH would be facilitated by appealing to the user's direct experience through sensory perception rather than depending on the symbolic representation of maps and signage. Surface pavilions would provide visible access points from street level while protrusions from the underground would open up the PATH to natural light. The goal of these strategic alterations is to achieve effective utilization of the PATH by a full spectrum of people, easing the pedestrian traffic flow through the downtown core.

The understreet tunnels are isolated as sites for redesign, using the addition of architectural elements that denote street

names and provide a sensory-coded experience relating to directional- and destination-based routes. The tunnels will become a layer of legible permanence in the ever-changing retail-dominated concourse. Embracing the artificiality of these insulated chambers, colours, textures, sounds and even scents will be infused into the tunnels, creating a memorable navigation pattern, where people can find their way by following their senses.

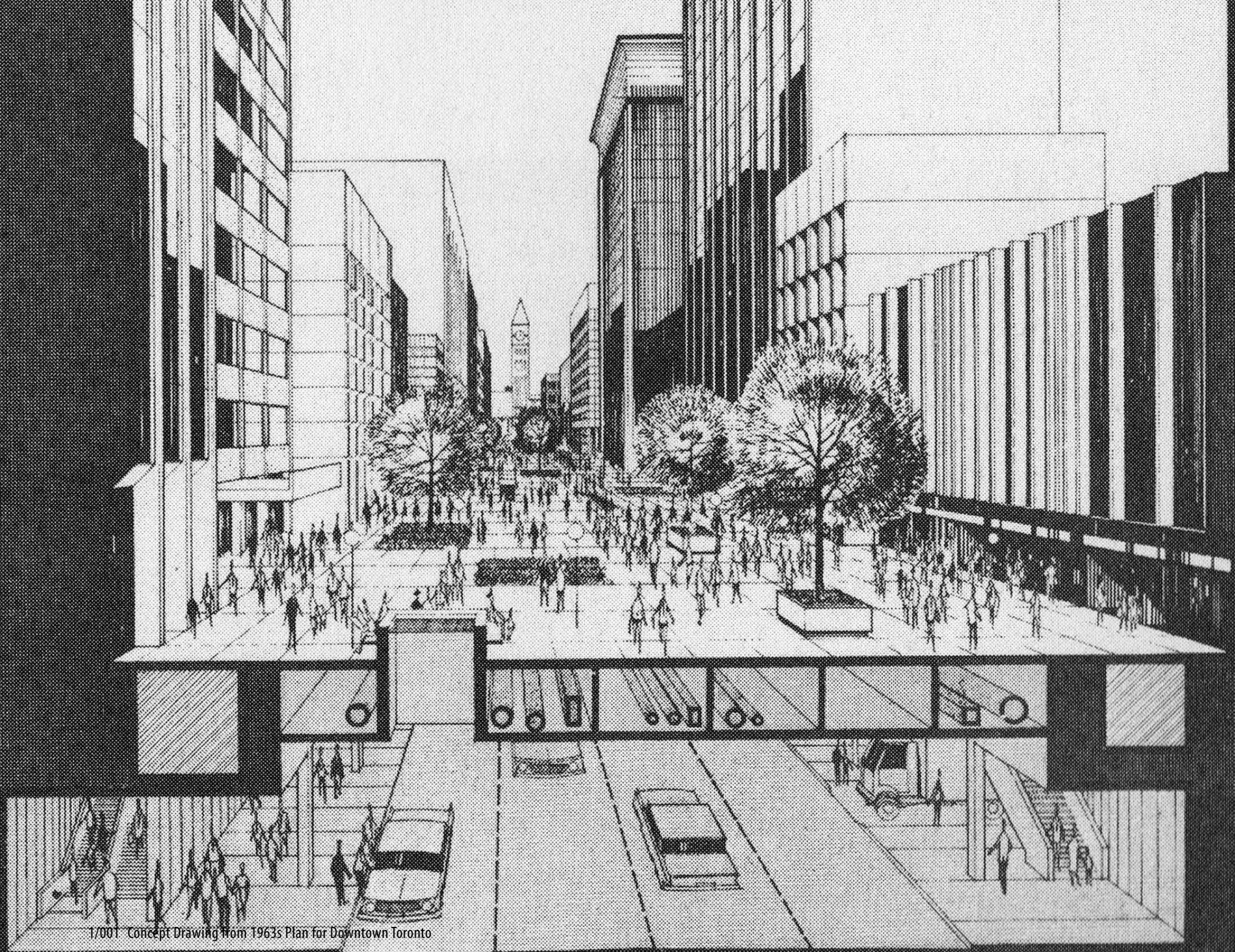
On the street level, sites for new and improved PATH entrance pavilions, and insertion of natural light are selected. A consistent language of vertical penetrations from the street into the PATH will visually integrate the public streets above with the climate-controlled sidewalks below.

This thesis is organized into three chapters, exploring the PATH through the themes of expanding, traversing, and surfacing. "Expanding" documents the history of its uncontrolled growth, the struggle of the city to guide its development, and provides a photographic analysis of the spaces along its major routes. "Traversing" addresses the current experience of navigating the PATH through two navigational experiments performed by a range of users, and then investigates the possibility of introducing sensory cues into the understreet tunnels to overcome difficulties of spatial orientation. "Surfacing" studies the conditions of existing entry points into the PATH and other similar systems around the world as well as venturing to propose sites where the PATH could gain a stronger street presence while providing natural light and views into the subterranean spaces.

1. Different sources have different dates for the Union Station to Royal York Hotel tunnel. 1929 was selected because that marked the opening of the Royal York Hotel. 1986 Underground report states 1924, other sources state 1927.



0/003 Entrance within the Royal Bank Plaza Lobby down into the PATH



1/001 Concept Drawing from 1963s Plan for Downtown Toronto

chapter one: expanding

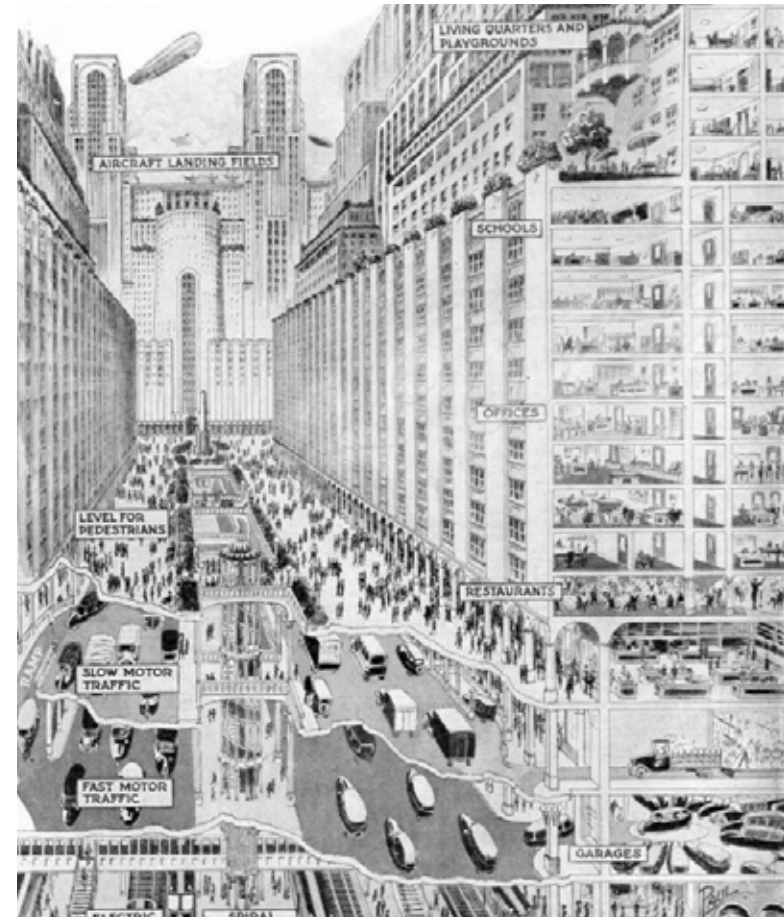
...it is the struggle between the demand for order and the will to formlessness, that assumes epic tone.

– Manfredo Tafuri *Architecture and Utopia* 1976

The PATH's history as a space that hovers between the private domain and public urban infrastructure is curated in a timeline that incorporates maps, images and pivotal events that have shaped its expansion. Beyond present day, the 2012 Masterplan speculates on growth opportunities and delineates potential sites for gateway entry points while outlining design principles that would render the PATH an accessible alternative to public sidewalks. The masterplan is not policy and growth will continue to be driven by private enterprise.¹

Instead of serving a wide range of the population, Toronto's underground pedestrian system is dominated by the commuter. In recent years, condo developments in the downtown core have increased the city's residential population while the PATH has grown to connect hotels and tourist attractions. Residents and visitors should be emerging as new user groups to the PATH.

In the past, stratification of the city, as in the separation of pedestrian and vehicular traffic, had been a utopian vision. The PATH's fragmented pieces require an imposition of order for it to work with the rectilinear city grid above. During peak hours, it is nothing more than a human highway, a non-place for commuters. Spatial qualities of the PATH are analyzed through photographs to determine opportunities to improve the PATH experience.



1/002 Concept Drawing of a Stratified City by Harvey Wiley Corbett, 1920

PATH timeline

1917 Eaton's Tunnels

The first public pedestrian tunnel in Toronto was constructed in 1900 under Albert Street to connect the Timothy Eaton department store at 178 Yonge Street with its bargain annex, which was situated on the northwest corner of Albert Street and James Street. Open to employees and shoppers, the tunnel facilitated the movement of stock and enabled shoppers to purchase more merchandise especially during the Christmas season without battling the inclement weather.²

By 1917, there were a total of five tunnels in the downtown core, joining the main store with the catalogue store, the bargain annex and the stable. The first tunnel, refurbished over the years and now joining the Eaton Centre to the Bell Trinity office complex, is still part of Toronto's PATH system.³

1929 Union to Royal York

After the fire of 1904 destroyed most of the buildings adjacent to the railway lands bounded by York Street, Wellington Street and Yonge Street, plans were proposed immediately for a new Union Station that would consolidate disparate stations already operating at capacity. Disputes of whether the tracks should pass over or under the streets kept it from opening until 1927.⁴

Across the street from Union Station stood the Queen's Hotel, one of the few buildings to have survived the fire. Canadian Pacific Railway (CPR) eventually acquired the site and demolished the modest hotel replacing it with the state-of-the-art Royal York Hotel, which opened in 1929 with ten elevators and an underground connection to Union Station. CPR believed that the tunnel would encourage visitors to stay at the Royal York.⁵

1954 Yonge Subway

Proposals for subway construction emerged as early as 1909 but were rejected by the public and remained dormant until after World War II when automobile traffic overwhelmed city streets. In 1954, the Yonge Subway line spanning from Union Station to Eglinton Station opened.⁶

1963 Subway Loop

In 1963, its extension curving under University Avenue and terminating at St. George Station was added.⁷ City sidewalks were also starting to be overcrowded. The construction of the subway loop created a mezzanine space for underground pedestrian walkways. Matthew Lawson, city planning commissioner between 1954 and 1967, believed in separating people from traffic and imagined that "much of the future of downtown was below grade".⁸

1973 Financial District

In 1955, Matthew Lawson approached the newly formed Toronto Dominion Bank to build their headquarters in the downtown core. The TD Centre became the first of many superblock office developments, occupying seven acres at the northwest corner of King and Bay, "a city within the city, a monument to Canada's progress."⁹ With the first of the original four towers conceived by Mies van der Rohe completed in 1967, the TD Centre has grown to a six-building complex, its last building opened in 1991. The plans for its underground space expanded from a post office into a full shopping arcade, with retail stores, services, restaurants and a movie theatre, before completion. It had been the largest underground shopping mall of its time.

By 1973, the financial district grew to include the Richmond-

Adelaide Centre (RAC), Commerce Court and First Canadian Place (FCP). The City of Toronto Planning Board supported the underground pedestrian system by exempting below-grade retail from density calculations while vertical separation of vehicles and pedestrians was endorsed as a solution to congestion.¹⁰

1984 Eaton Centre Link

With the completion of the Adelaide Street tunnel in 1984, partially paid for by the city, the underground became more connective. It was now possible to traverse the downtown core from Union Station to City Hall and, in a round about way, to the Eaton Centre without stepping outside.¹¹

1993 Branding the PATH

Each segment of the system is controlled by its respective property owner and with approximately thirty-five corporations involved, the complexity of the network was forbidding to users.¹² In 1987, the city became the coordinating agency of the underground and financed its wayfinding system. The underground was rebranded as the PATH, officially reopening in 1993 as a comprehensive pedestrian network with wayfinding signage.

Despite the economic downturn of the 1990s, the PATH grew to reach public and cultural destinations such as the Metro Toronto Convention Centre (MTCC), Metro Hall, the CBC building, the CN Tower, the Rogers Centre and the Air Canada Centre (ACC).

2009 Union to Eaton Centre

The opening of the Bay Adelaide Centre (BAC) marked the long-awaited direct route from Union Station to the Eaton Centre.

In the Toronto Official Plan 2010, city planners recognized that

three decades of downtown development has not required larger road capacities because people live within walking or cycling distance from home to work and other activities. This growing pedestrian population demands that streets, sidewalks and the connecting system of public spaces be “spaces to be enjoyed in their own right.”¹³ The quality of the design, construction and maintenance of these parts of the public realm are vital to the image of downtown and to creating a place in which to walk and to linger. The appeal of downtown to pedestrians is an essential part of making the area more attractive and competitive.

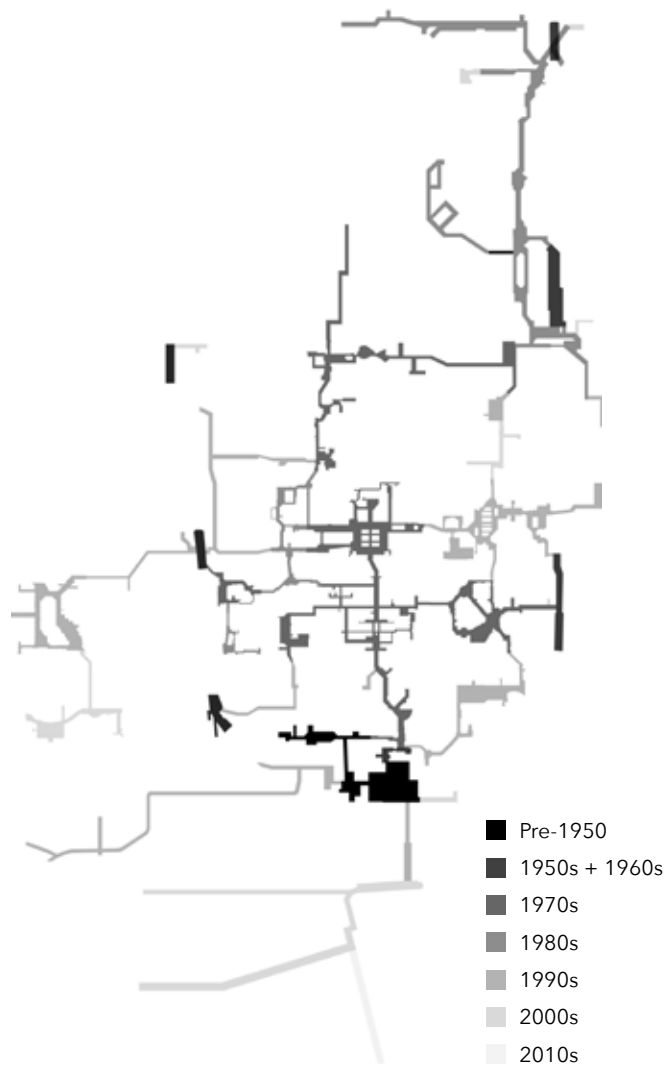
These principles of design should apply also to the PATH system, since it is another way, especially in extreme weather conditions, of traversing the downtown core.

2014 Gardiner Bridge and MaRS

In August 2014, after a year and a half of negotiations between the City of Toronto and Oxford Properties, one of the largest developers of PATH buildings, a new pedestrian bridge was installed over Lake Shore Boulevard. A long clear glass vessel hangs below the Gardiner. The city’s idea of having an underground route was abandoned as building underground near the waterfront is prohibitively expensive.¹⁴ The bridge connects the Union Station to RBC WaterPark Place, via the ACC, a condition that RBC stipulated before agreeing to relocate in Toronto’s former waterfront wasteland. This new PATH connection signifies that the city’s Financial District is no longer limited to King and Bay.

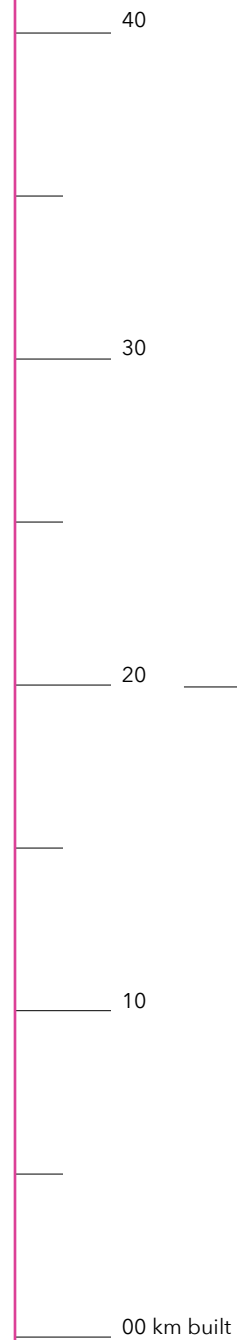
Also in 2014, the PATH map extended to include the underground spaces of the MaRS Discovery District at College and University Avenue. While not yet connected to the rest of the PATH, the 2012 Masterplan anticipates it will be in the future.

PATH timeline



1/003 Growth of the PATH

010



1900



1/004 Albert Street during the construction of the first underground tunnel in Toronto for the Timothy Eaton Department Store, 1900



1/005 Potential site of Union Station after the fire of 1904

1904

1900

1905



1913

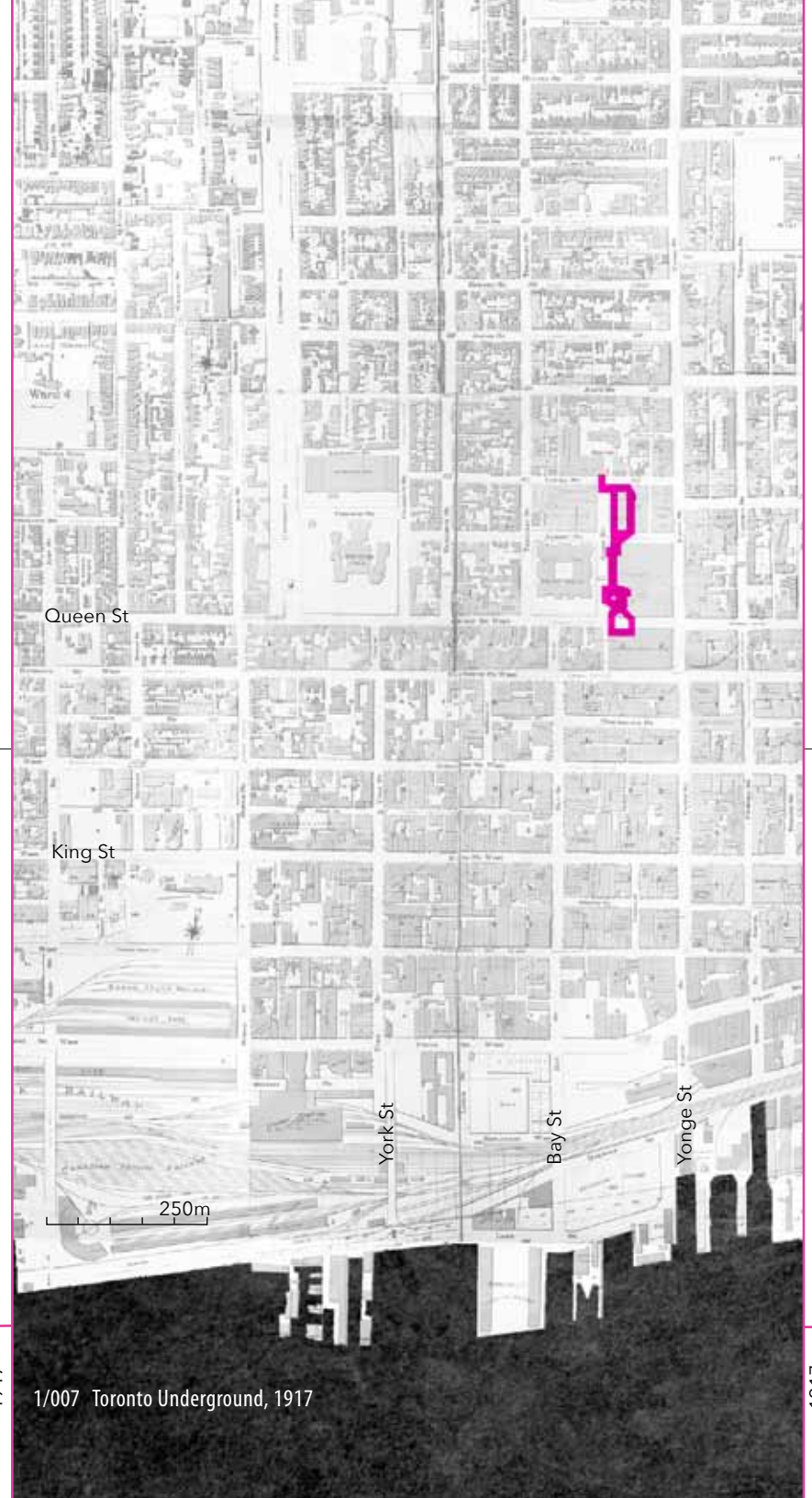
1/006 Drawing of "The Future of Cities" by Harvey Wiley Corbett, 1913. Overcrowded city centres triggered Corbett to imagine a city vertically stratified by function. Living space would be in skyscrapers, beneath would be schools, offices then restaurants. The city's roads and railways would be buried underground, leaving vast pedestrian concourses at grade.¹⁵

1910

1915

eaton's tunnels

1917



1/007 Toronto Underground, 1917

1917

1920

1925

012

1929



1/008 The Royal York Hotel, 1929

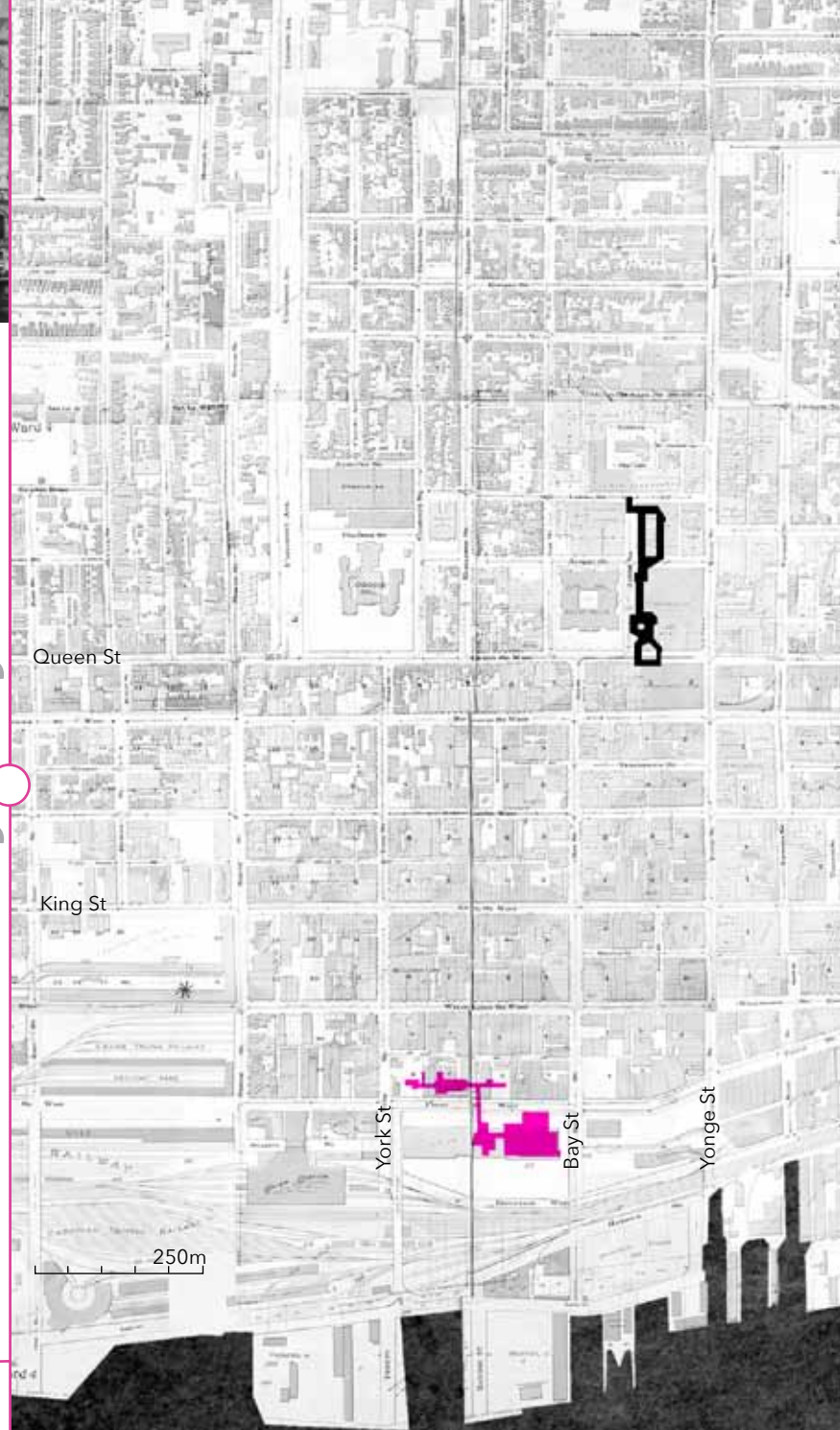


1/009 Union Station, 1927

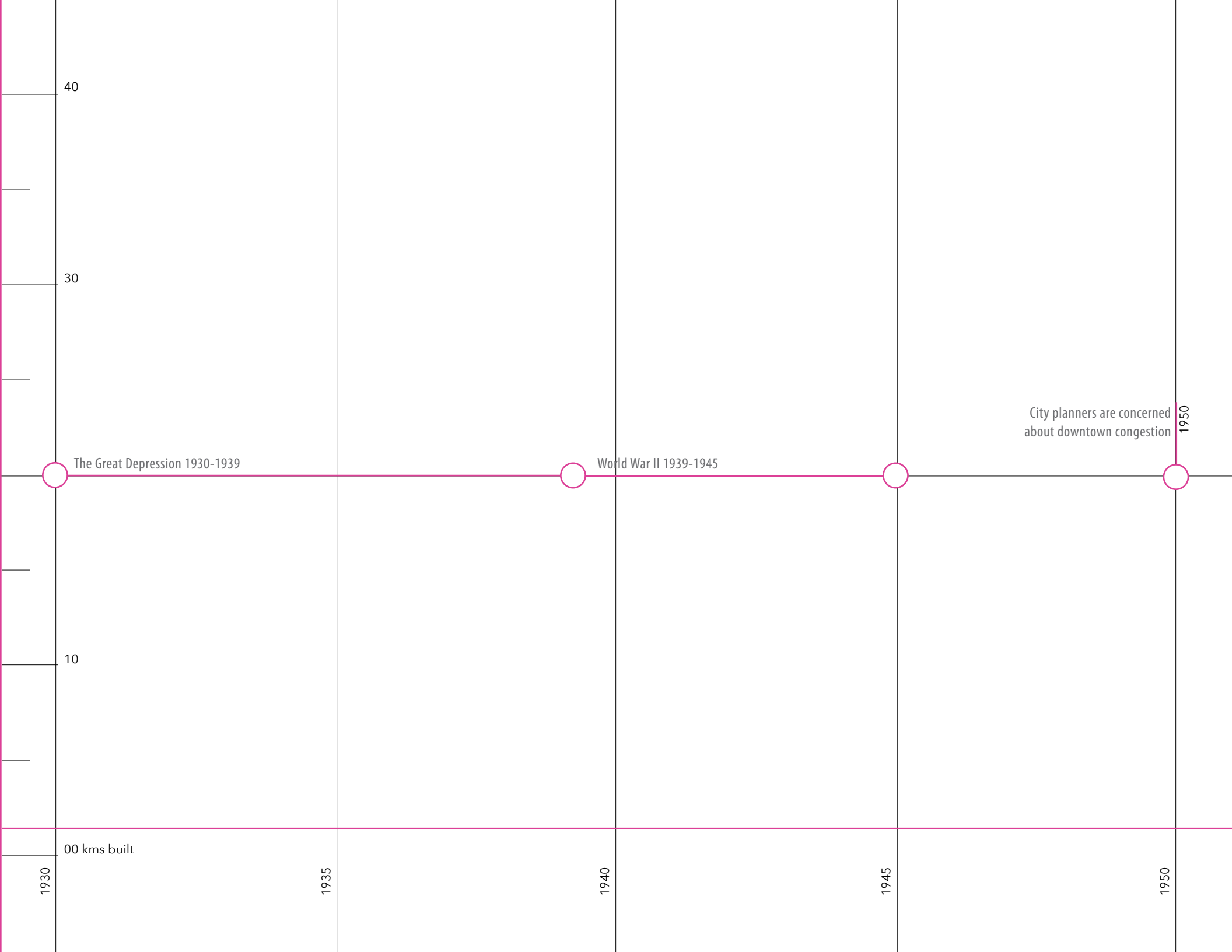


1/010 Movie Still from Metropolis, 1927

union to royal york



1/011 Toronto Underground, 1929



40

30

10

00 kms built

The Great Depression 1930-1939

World War II 1939-1945

City planners are concerned about downtown congestion

1950

1930

1935

1940

1945

1950

1950

00 kms built

1954

yonge subway

40

30

20

10

1/012 Toronto Underground, 1954

250m

Queen St

King St

York St

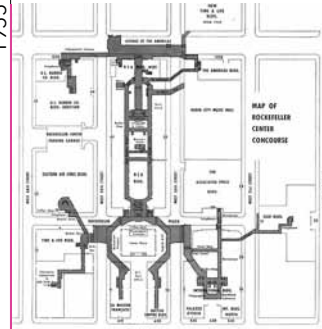
Bay St

Yonge St

1954

1955

1955



1/013 Vertical separation relieves congestion at Rockefeller Centre in Manhattan

1958 Elevated walkways in Viljo Revell's design for the New City Hall and Civic Square

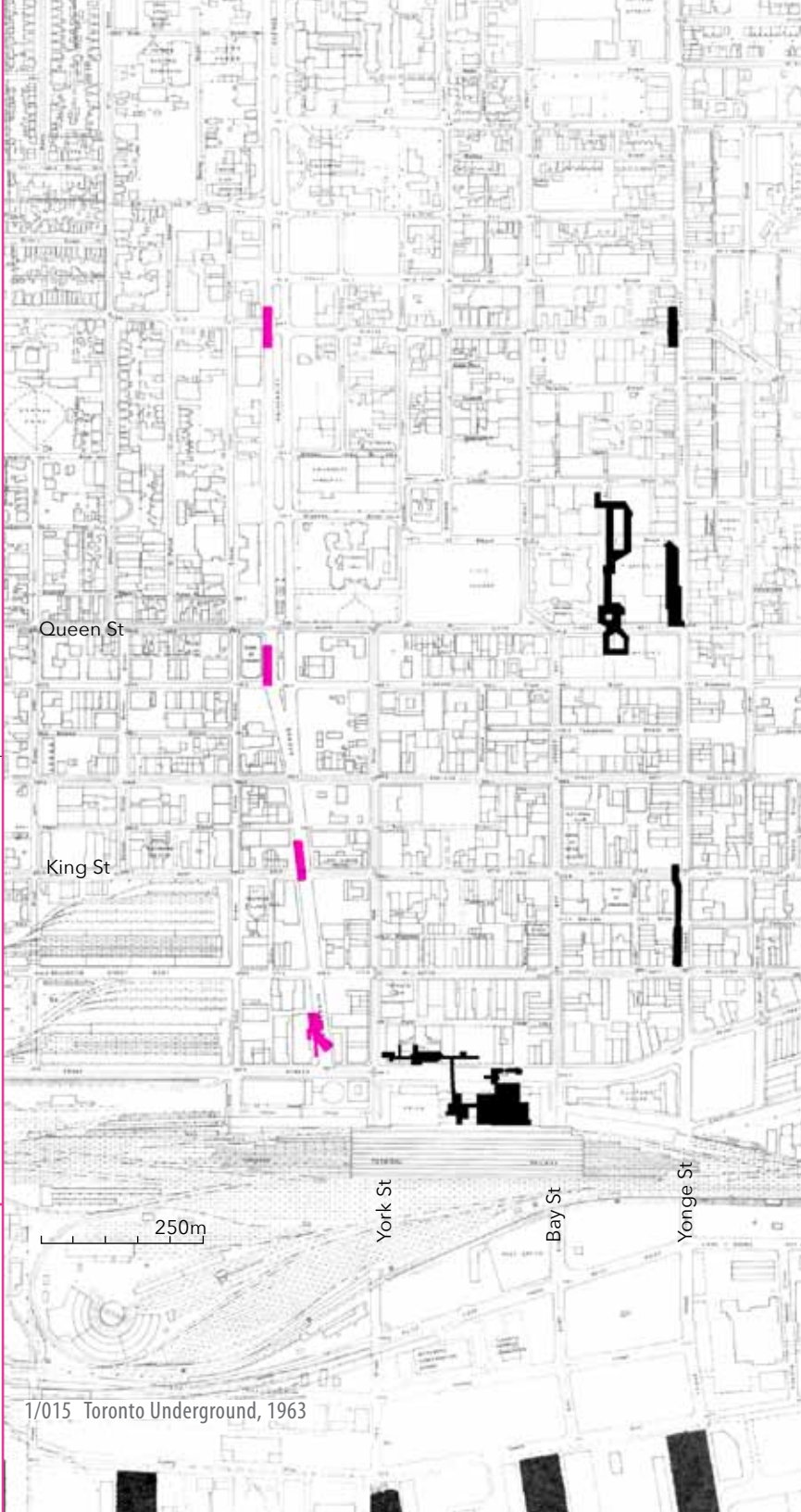


1/014 Concept Drawing of Queen Subway Station

1960

1963

1/015 Toronto Underground, 1963



subway loop

1963

1965

1967

TD Bank Tower at 66 Wellington Street West is the first of the six-tower superblock to open

1968

CIBC Commerce Court opts not to connect to the underground

1972

Reform group in city council favours the ideas of Jane Jacobs. City funding for underground development pulled

1970

1973

1/016 Toronto Underground, 1973

250m

Queen St

King St

York St

Bay St

Yonge St

1973

financial

district

CIBC Commerce Court joins underground by tunnelling across Bay Street to TD Centre. New official plan favours street-related shopping.

1975

1975

1/017 Toronto Skyline, 1973



1977

City agrees to pay 50% of cost for King Street tunnel between TD centre and First Canadian Place. The Toronto Eaton Centre opens.

1978

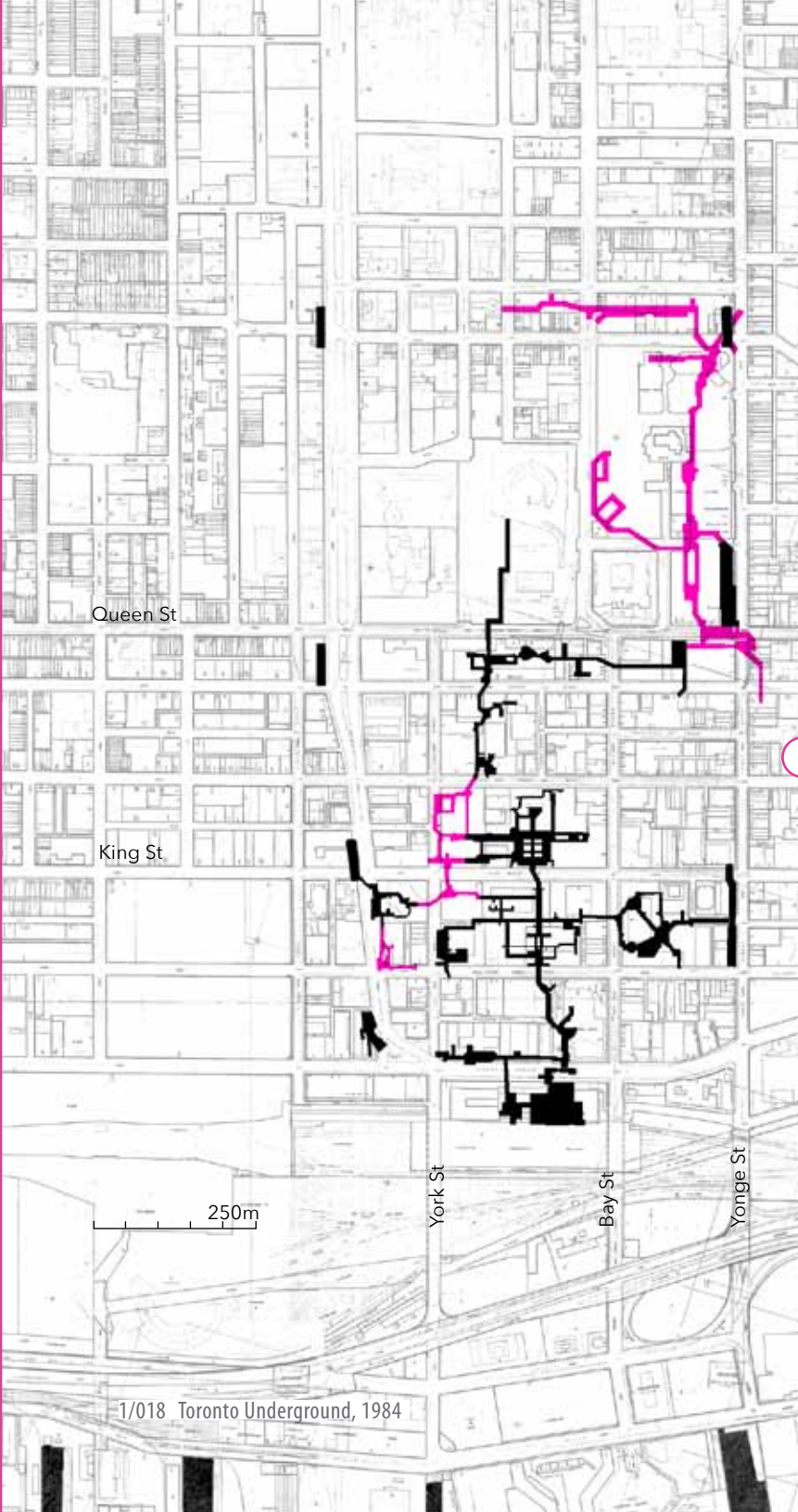
City contributes nothing to Front Street tunnel linking Royal Bank Plaza to Union Station

1980

1980

City pays one sixth of cost of Adelaide Street tunnel

1984



eaton centre link

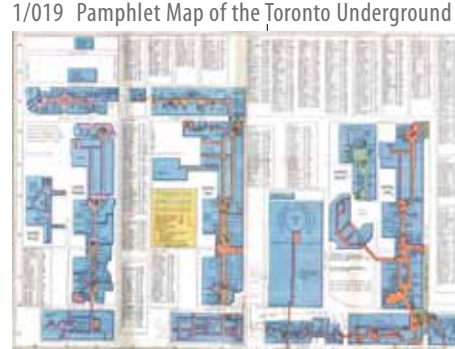
1984

1985

1990



1993



1/020 Pamphlet Map of the Toronto Underground

1987
The city becomes
coordinating agency of the
underground

1986
The city commissions a feasibility report on
the implementation of signage system to
increase legibility of the underground

The underground is
branded as the PATH with
wayfinding signage

1993

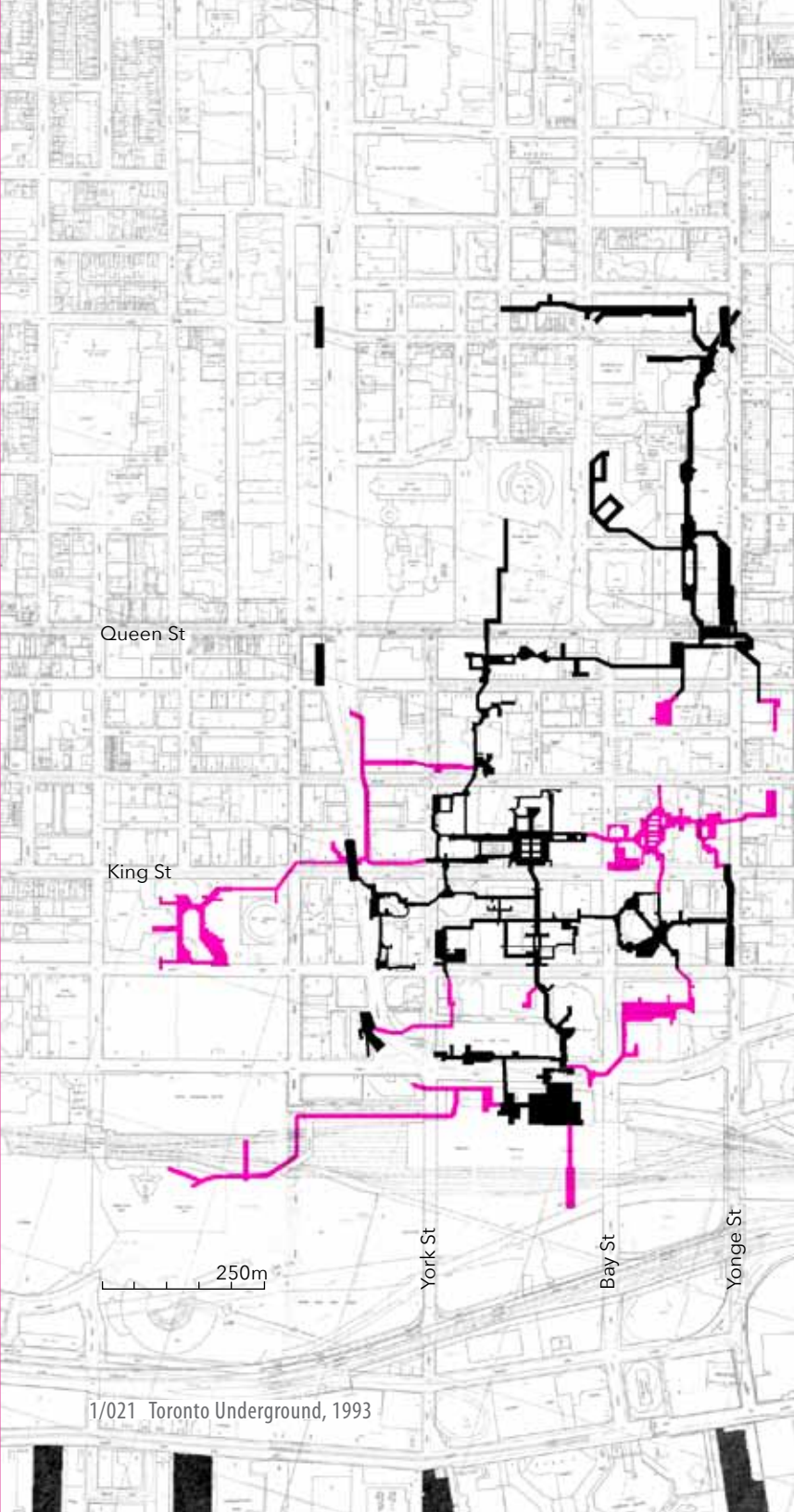
00 kms
built

10

20

30

40



1/021 Toronto Underground, 1993

branding the PATH

1993

1995

1995

September 1995 the City of Toronto Planning and Development Department issues "Underground Pedestrian System Design Guideline" to shape the growth of the PATH

1/022 PATH Branding Elements



2000

2005

2007

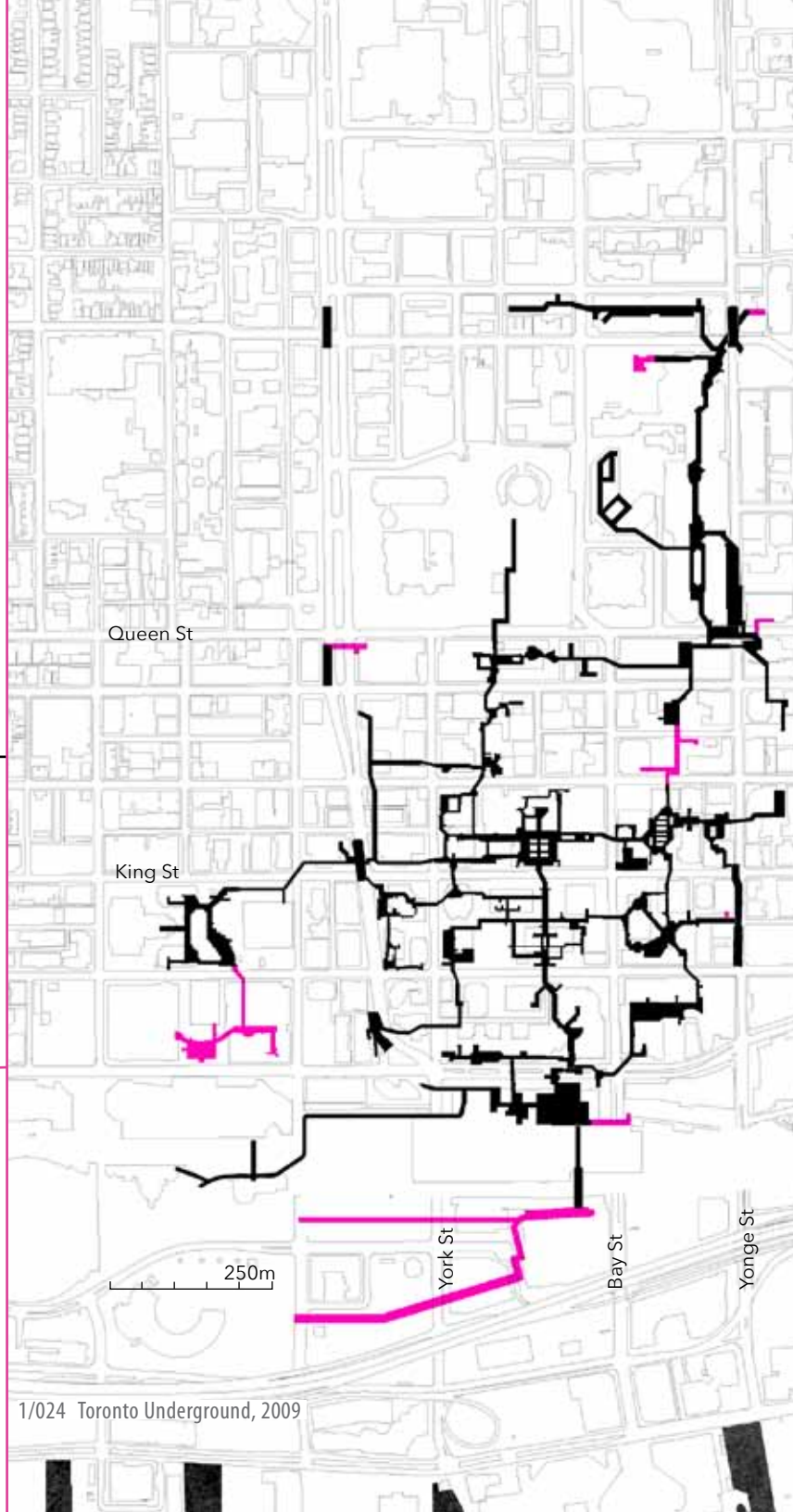


1/023 Proposed design for the PATH in the underground parking garage of City Hall. Cut from final implementation.

union to eaton centre

2009

1/024 Toronto Underground, 2009



2009

2010

2012 Masterplan proposed by the city with consultation from stakeholders of the PATH

Bay Adelaide Centre open direct route from Union Station to the Eaton Centre. Trump Tower and Shangri-La opt not to join the PATH.

2012

40

30

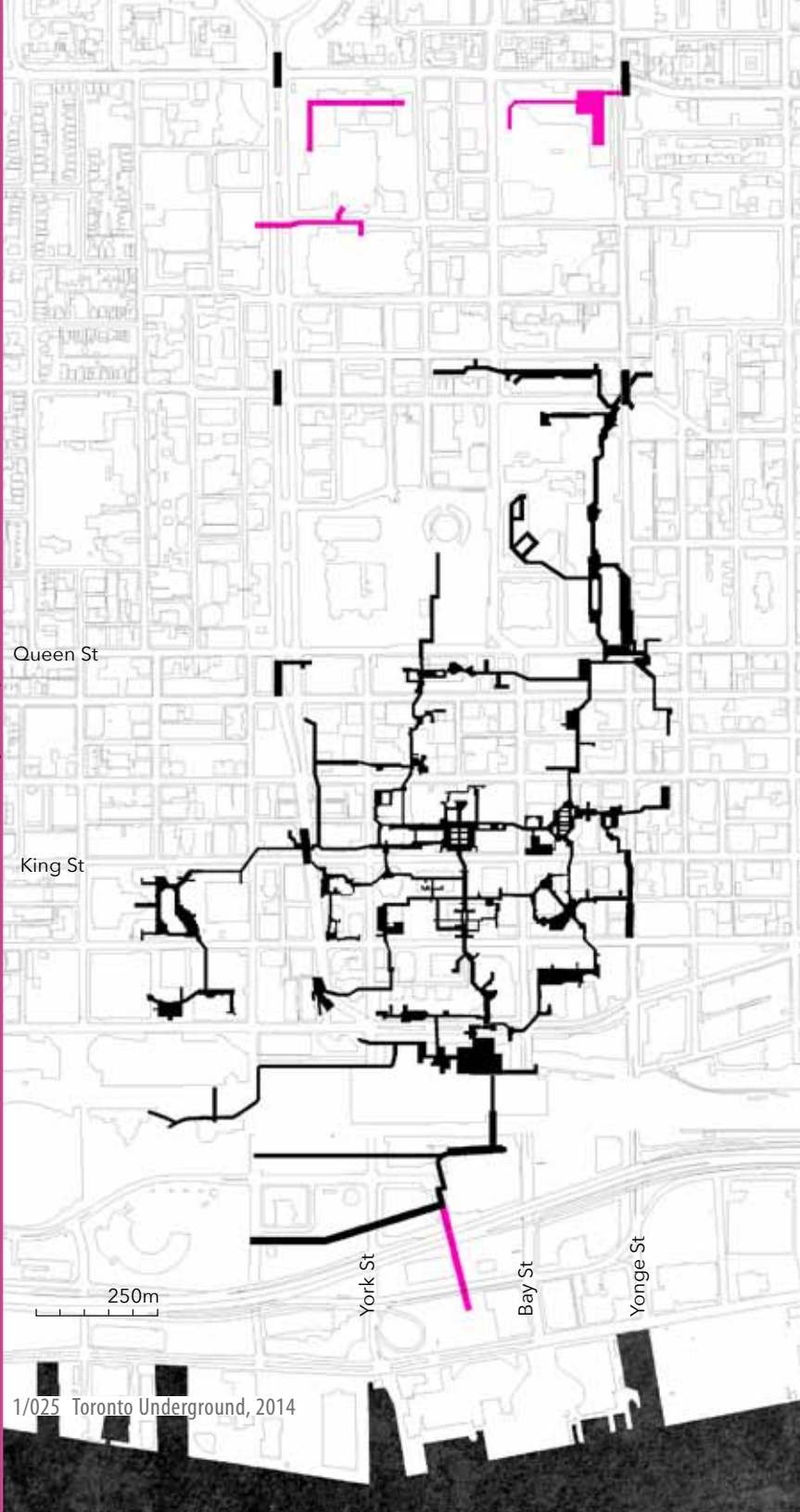
20

10

00 kms
built

2014

1/025 Toronto Underground, 2014



2014

2015

gardiner bridge + MaRS



1/026 The PATH bridge under the Gardiner Expressway connecting the Air Canada Centre with RBC WaterPark Place.

2020

00 kms
built

10

20

30

40





1/028 Public Drop-in Event, October 2011 for 2012 PATH Masterplan Document

speculative growth

The PATH masterplan produced in 2012 speculated growth in nearly all directions and categorized them into three levels of urgency: high priority, medium priority and long-term development opportunities. Some "high priority" connections, such as those to the waterfront, have been built. However, these linkages were already under construction before the masterplan was published. According to one author of the masterplan, the medium priority and long-term opportunities identified "are still completely relevant, but they're going to take a lot of time to achieve in many cases."¹⁶

Queen St

King St

250m

York St

Bay St

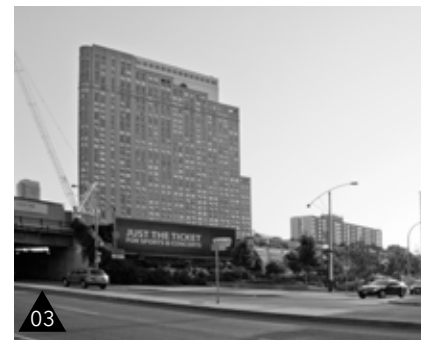
Yonge St



1/030 Dundas Square at Dundas and Yonge



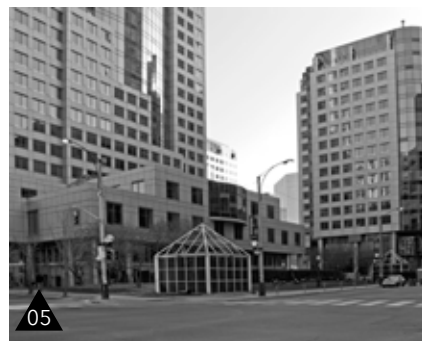
1/031 Berczy Park near St Lawrence Market



1/032 Lake Shore and Yonge



1/033 Queens Quay and York



1/034 Metro Hall at Front and John

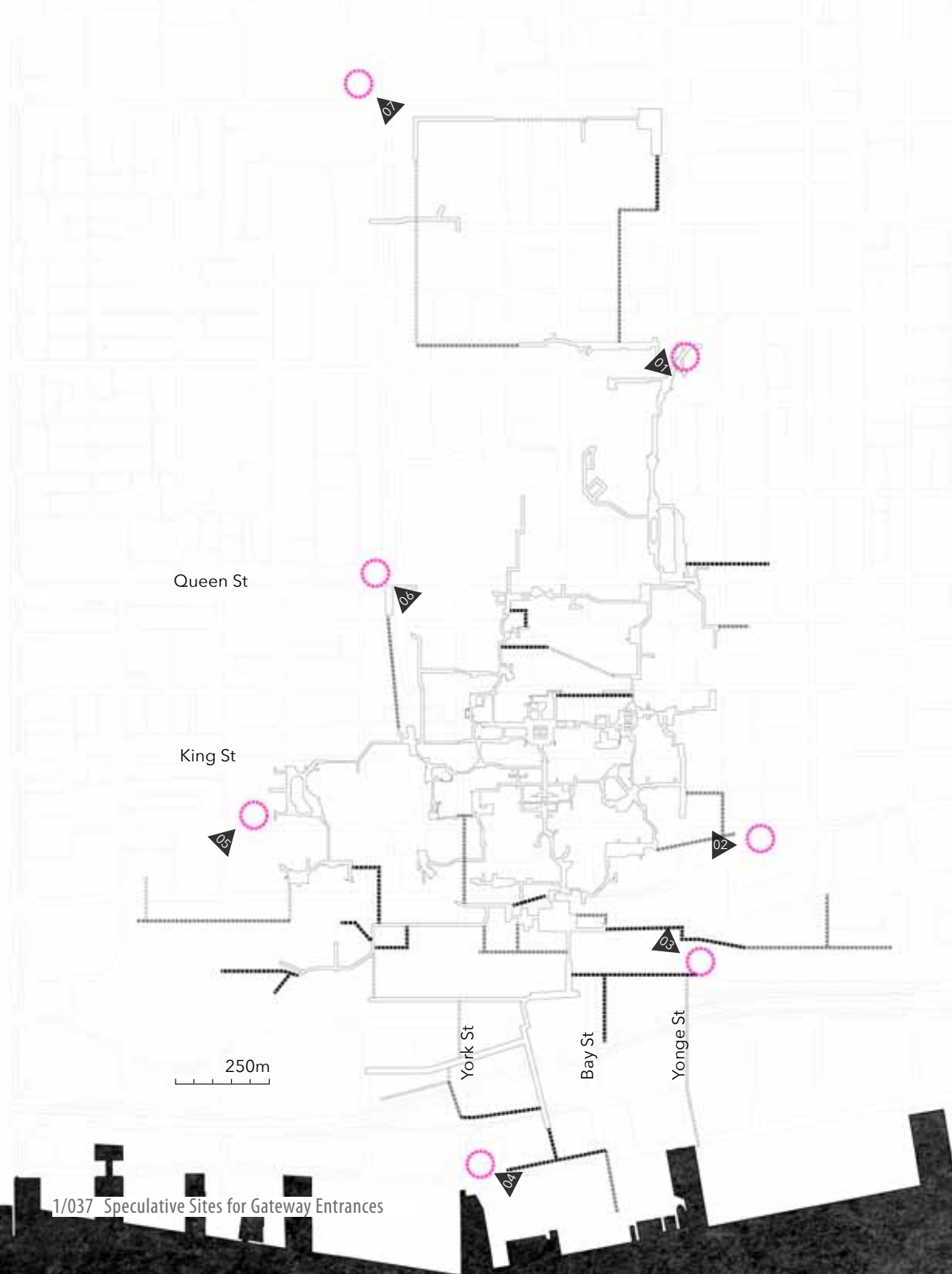
024



1/035 The Campbell House at Queen and University



1/036 College and University near Queen's Park



speculative sites

The Canadian Opera Company (COC) opened in 2006 with an entrance to Osgoode subway station. Logically, the next step would be to connect the COC with the Sheraton Centre Hotel, which would open up an interior route from at Queen and University to Queen subway station at Queen and Yonge. This potential to expand along Queen Street was met with anxiety. Bringing the PATH farther west on Queen was seen as a threat to street life and existing businesses at grade on Queen West. These concerns led to the recommendation of "portals" or rationalized sites for future termini to be installed at these boundaries as gateways between an existing neighbourhood and the PATH, which could be funded by the BIA or through Section 37 funds.¹⁷

PATH plans

Since the city became the coordinating agency of the PATH, three major documents have been produced to guide its growth and development. The following is a summary of the intent and recurring themes of the documents.

Toronto's Underground City, July 1986

This was a feasibility study on the implementation of a uniform wayfinding system and branding to overcome the under-utilization of the fragmented network. "It is beneath the dignity of such a world-class city to have miles of streets that can't be used because no one (neither citizens nor tourist) can find their way about them."¹⁸ Another issue is that it is Toronto's "best-kept secret" as many people "do not know about it at all."¹⁹ Meanwhile, Montreal's Underground City is advertised in The New Yorker magazine and is rated two stars in the Michelin Tourist Guide to Canada.²⁰ The priority highlighted in this document was to brand Toronto's Underground City as T.O. BELOW.

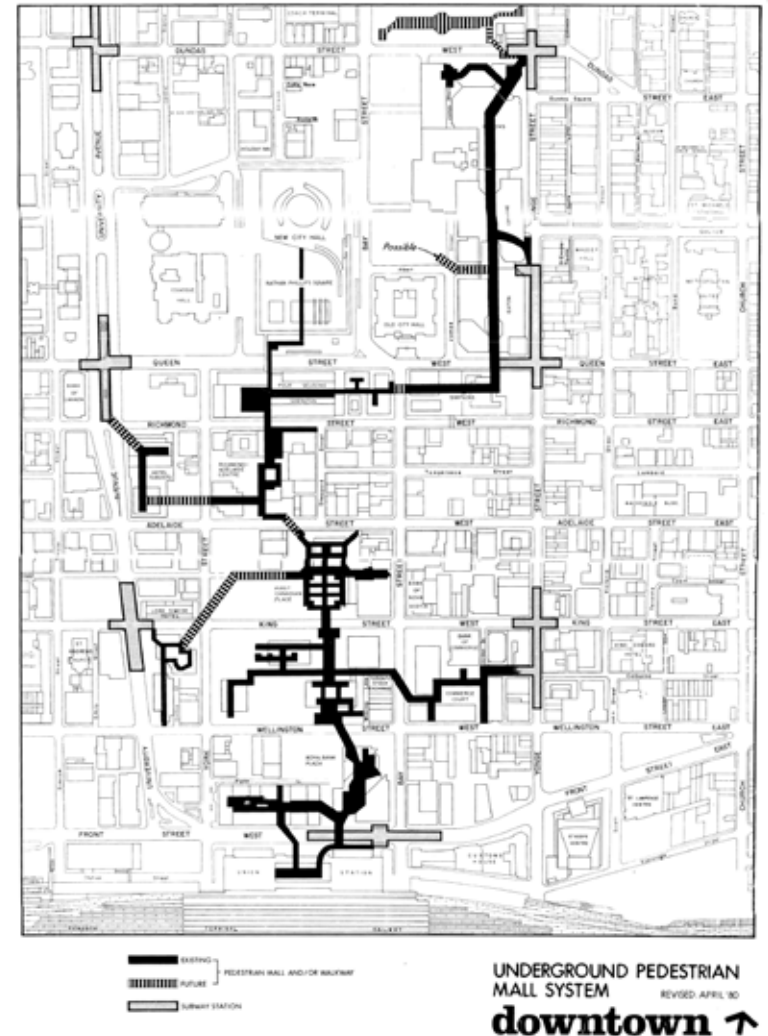
Underground Pedestrian System, September 1995

After the implementation of the PATH wayfinding system, navigation remained a primary concern. Proposed solutions included creating rectilinear paths to match the city grid, preserving sightlines, ensuring convenient connections, posting hours of operations at entry points, maximizing natural light, adding features such as public art, seating, and landscaping, and providing barrier-free access.

PATH Pedestrian Network Masterplan, January 2012

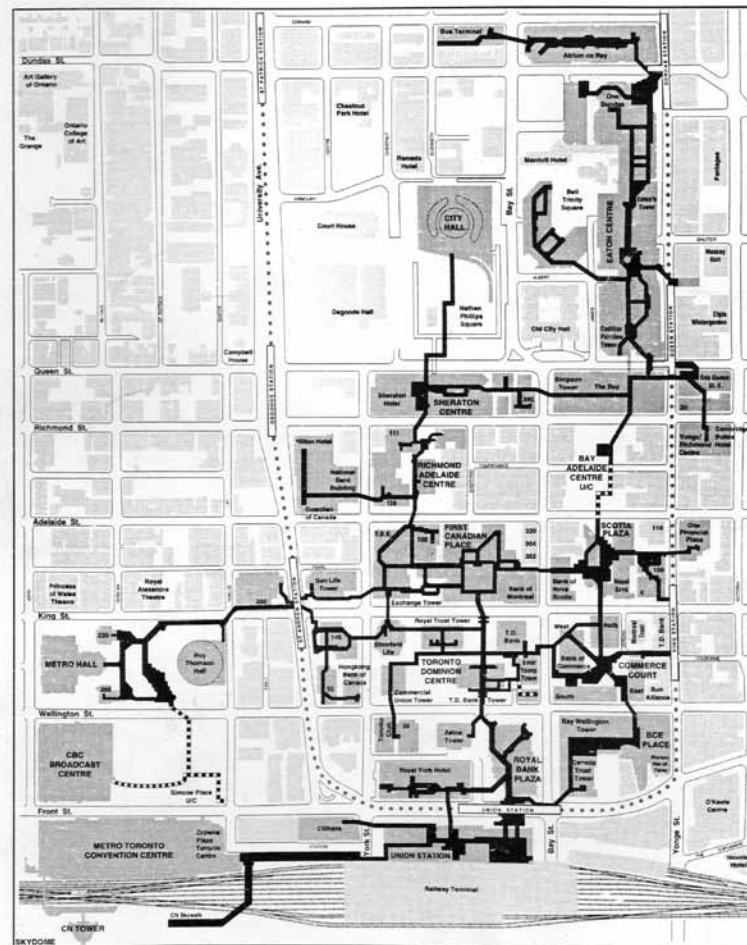
Most recently in the PATH Masterplan of 2012, four major themes prevail: fixing the navigation difficulties, ensuring convenient connections to transit, adding features such as public art which could help market the PATH as a destination, and incorporating sustainable and accessible design.

T.O.BELOW The place to go...
You'll never fight rain, sleet, or snow
Whenever you shop at T.O.BELOW
The people who know
Shop at T.O. BELOW

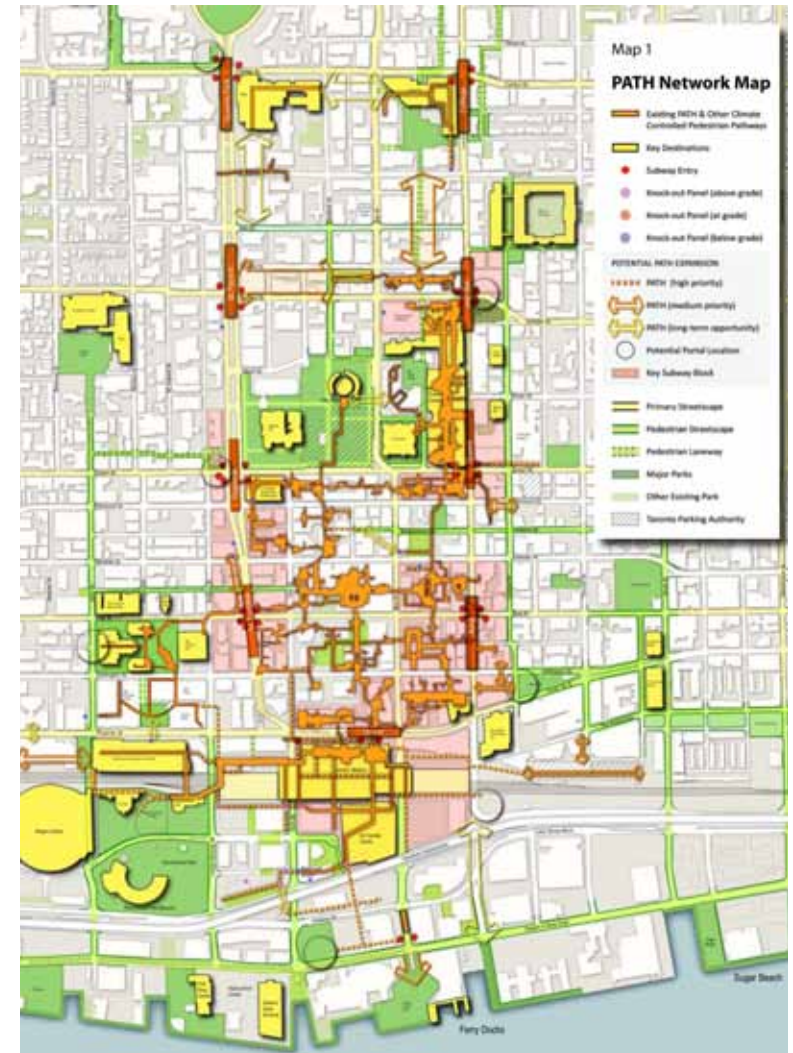


1/038 Map of Underground Pedestrian Network, April 1980

UNDERGROUND PEDESTRIAN SYSTEM Design Guidelines



1/039 Map of Underground Pedestrian Network, September 1995

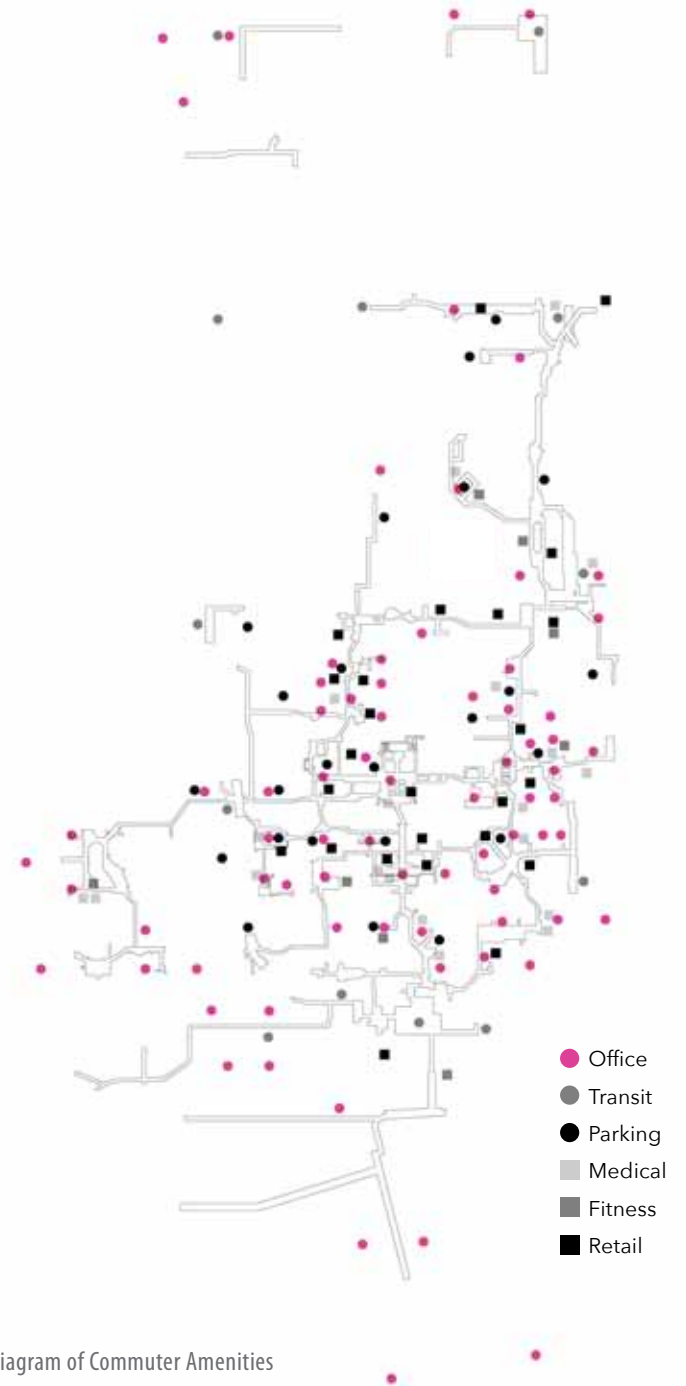


1/040 Map of Underground Pedestrian Network from Masterplan, January 2012

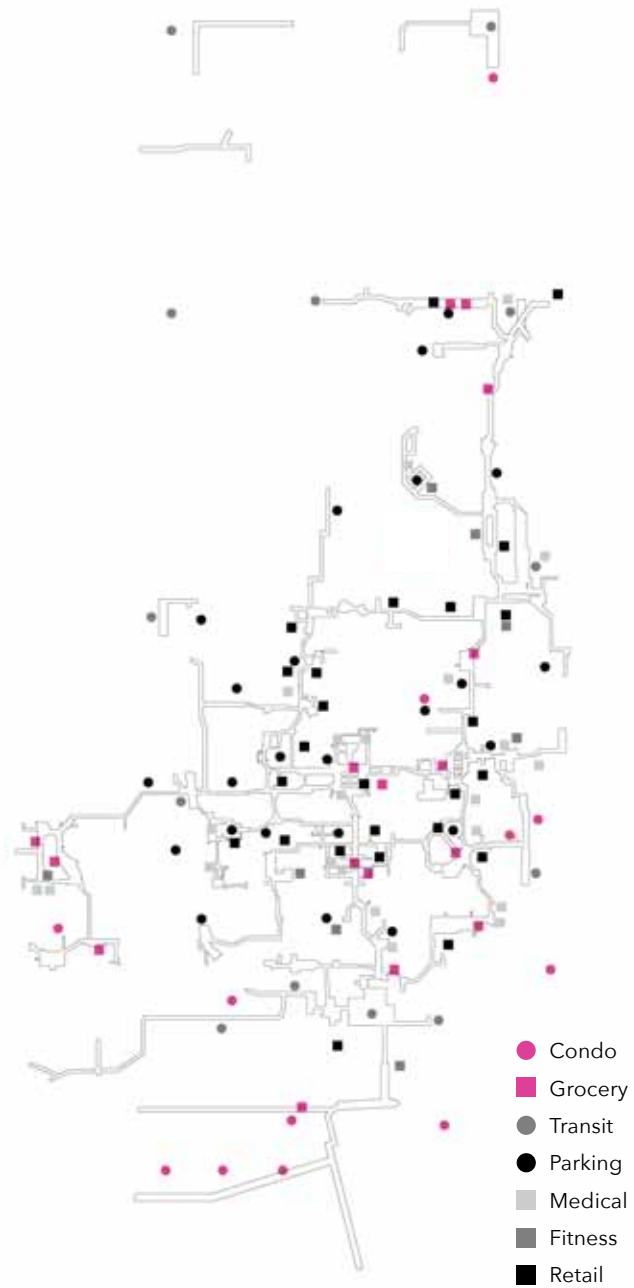
PATH amenities

Despite the various convenient amenities available in the PATH and the city's wishes for more of the general population to use the PATH on a regular basis, the current largest user group remains limited to office workers who commute into the Financial District. The following series of diagrams show the approximate location of amenities such as transit, parking, medical services, fitness centres and retail in relation to the locations that are of interest to the existing and potential user groups.

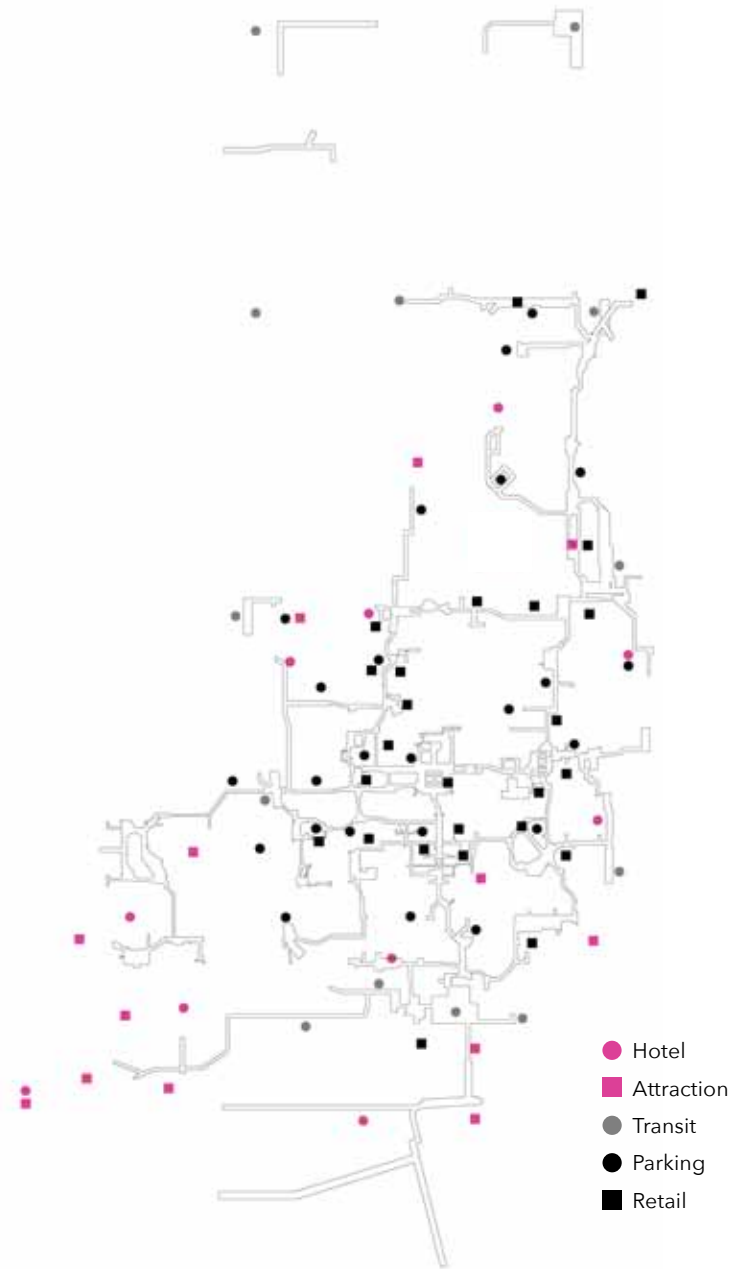
The user groups are labeled as the commuter, the resident and the tourist. The commuter refers to office workers who commute into the Financial District. The location of the commuter group is assumed to be the office towers. The resident refers to the growing downtown population who live in condos that may be connected to the PATH. The location of the resident is assumed to be the condos. The tourist refers to visitors to the city who may be staying at one of the many hotels connected to the PATH and wanting to visit the tourist attractions connected to the PATH. The location of the visitors are assumed to be the hotels and the attractions.



1/041 Diagram of Commuter Amenities



1/042 Diagram of Resident Amenities



1/043 Diagram of Tourist Amenities

PATH areas + routes

After countless thorough walks through the PATH, four areas were selected for spatial photographic analyses: the Union Station loop, the parallel alleys of King Street, the emerging Queen Street corridor, and the Waterfront extension into the new South Financial Core.

1. The Union Station Loop

The Union Station loop roughly mimics the Yonge-University-Spadina subway loop. Two main routes emerge: one veering to the east and north to the Eaton Centre and beyond, and the other heading north and then veering west toward City Hall.

The photographic documentation of this loop is subdivided into two sections: Union Station Eastside Route (E) and Union Station Westside Route (W).

Union Station (E) begins at the Toronto Coach Terminal, then eastward to Atrium on Bay, and southward to Union Station, via the Eaton Centre, the Hudson's Bay Company, the BAC, Scotia Plaza, Commerce Court, and Brookfield Place.

Union Station (W) begins at Royal Bank Plaza (RBP) from Union Station, northward via the TD Centre, FCP, westward to 130 King West (Exchange Tower), and northward to the RAC, the Sheraton Centre Hotel, and City Hall.

2. The Parallel Alleys of King Street

Along King Street, there are two parallel corridors connecting King subway station with St. Andrew subway station. With one route north of King Street and the other south of it, in the 1960s city planner Matthew Lawson envisioned that these corridors would adopt a nomenclature relating to the aboveground streets, i.e. King Alley North and King Alley South.²¹ West of St Andrew station, there are a series of lengthy tunnels that span west toward Metro Hall.

The photographic documentation of these alleys is separated into two sections: King Alley North (N) and King Alley South (S).

King Alley (N) begins at the street entrance to the King subway at the northeast corner of King and Yonge. Once underground, there are stairs from the subway station that exit northwest to the Royal Bank Building through to Scotia Plaza. After a convoluted route within Scotia Plaza, the sequence of buildings is westward through FCP, Exchange Tower, Sun Life Tower, St Andrew subway station and terminating at 200 King Street West.

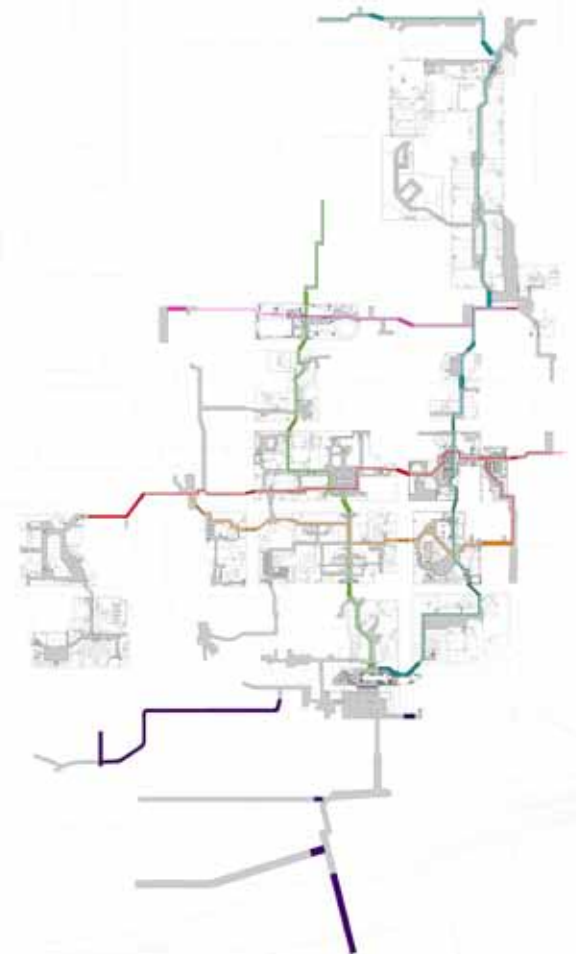
King Alley (S) begins at Metro Hall, passes by Roy Thompson Hall and heads east to St. Andrew subway station. The sequence of buildings is east through 145 King Street West, Standard Life Centre, the TD Centre, Commerce Court and passing by 1 King West before entering King subway station.

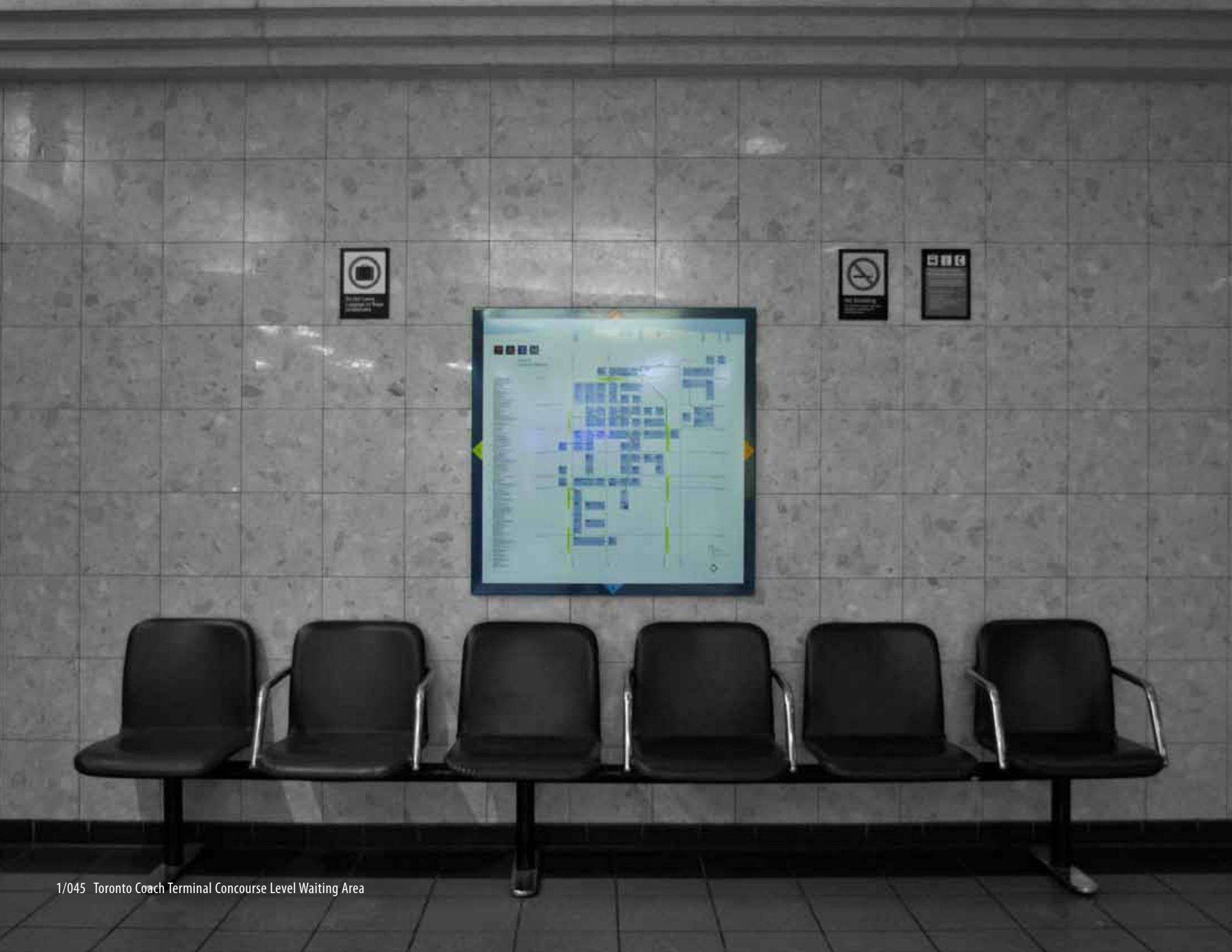
3. The Emerging Queen Street Corridor

Photographic documentation of this route-in-progress is in two parts. The first four images pertain to the western portion of the route from the COC to Osgoode subway station. The rest of the images are a walkthrough starting from One Queen East, westward to the Hudson's Bay Company, the Thomson Building and terminating at the Sheraton Centre Hotel where the connection to the COC could be constructed.

4. The Waterfront Extension

Simultaneous to the construction of the Union Pearson Express and the transit improvements along Queens Quay are extensions of the PATH southwest of Union Station toward the new Southcore Financial Centre and directly south toward the waterfront. The PATH in the waterfront district consists mostly of bridges or long walkways above the street.

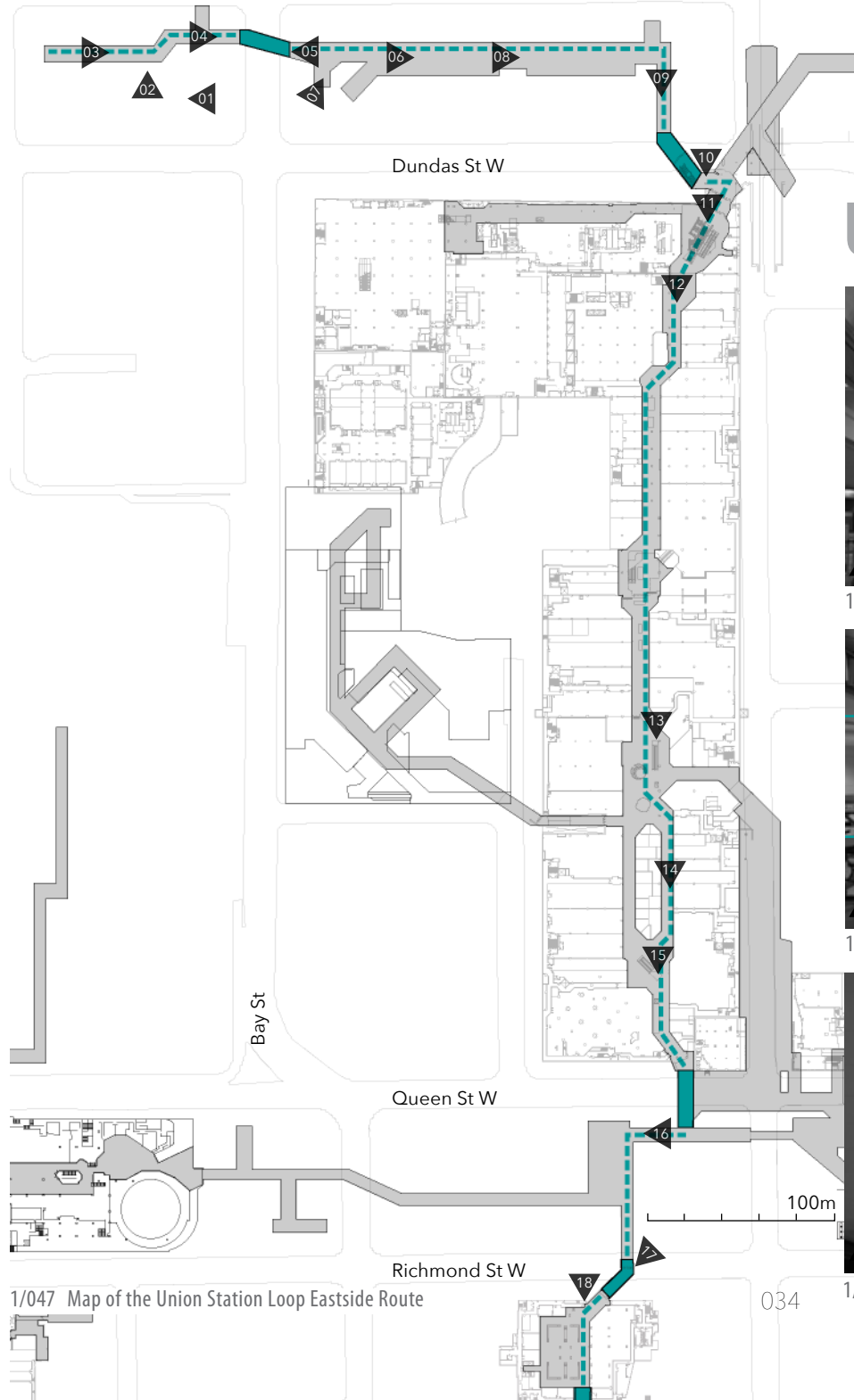






EXIT





union station (e)



1/048 Toronto Coach Terminal Main Floor



1/049 Toronto Coach Terminal Stairway to PATH



1/054 Atrium on Bay Food Court



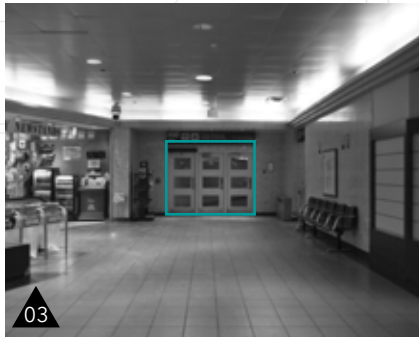
1/055 Atrium on Bay Market



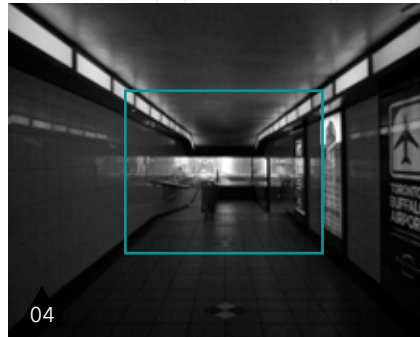
1/060 The Toronto Eaton Centre Atrium



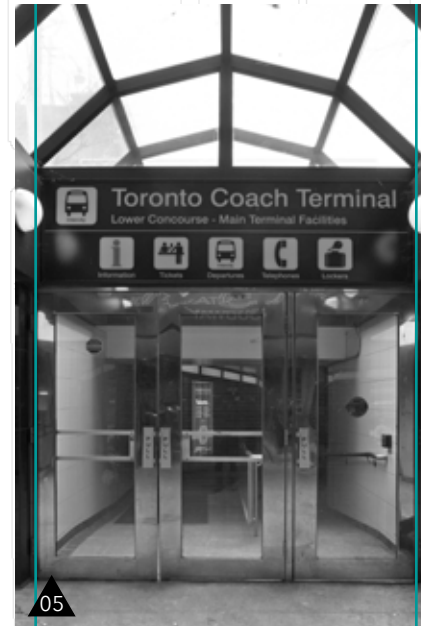
1/061 The Toronto Eaton Centre Concourse Level



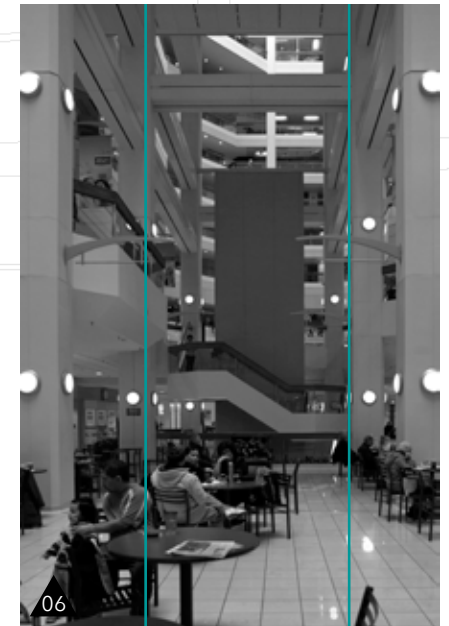
1/050 Toronto Coach Terminal Concourse Level



1/051 Bay St Tunnel, north of Dundas St



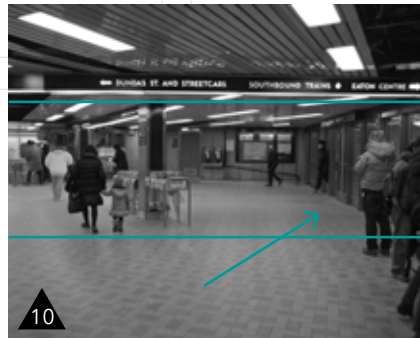
1/052 Bay St Tunnel, north of Dundas St



1/053 Atrium on Bay



1/056 Dundas Tunnel entering Dundas Station



1/057 Dundas Subway Station



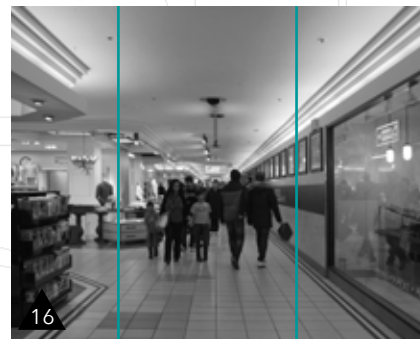
1/058 The Toronto Eaton Centre Stairway



1/059 The Toronto Eaton Centre



1/062 The Toronto Eaton Centre



1/063 The Hudson's Bay Company

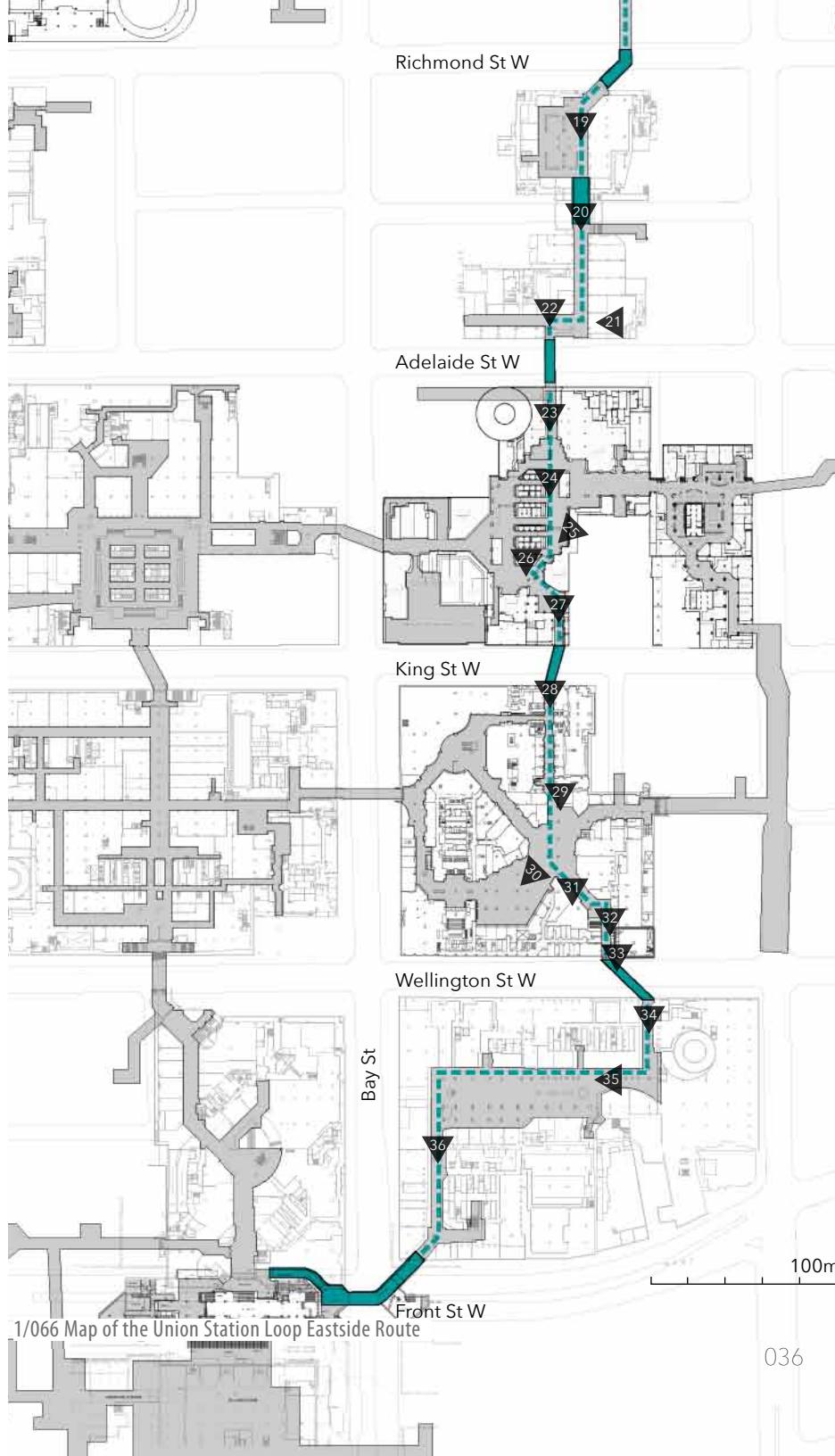


1/064 Richmond St W Tunnel, east of Bay St

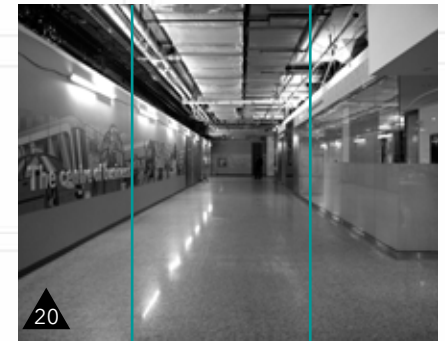


1/065 Bay Adelaide Centre Food Court

union station (e)



1/067 Bay Adelaide Centre



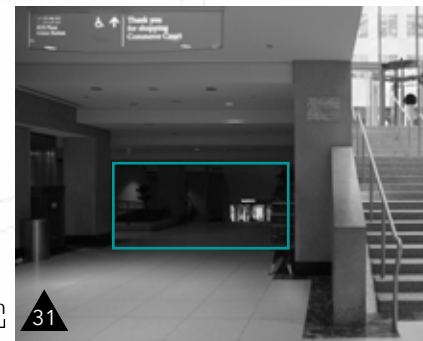
1/068 Bay Adelaide Centre



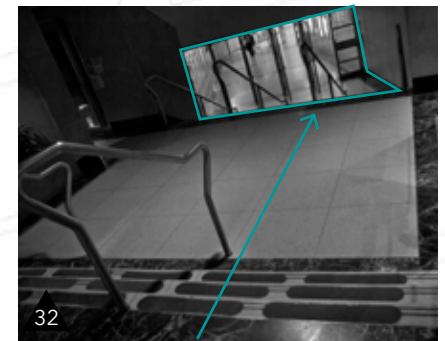
1/073 Scotia Plaza Concourse Level Second Cup



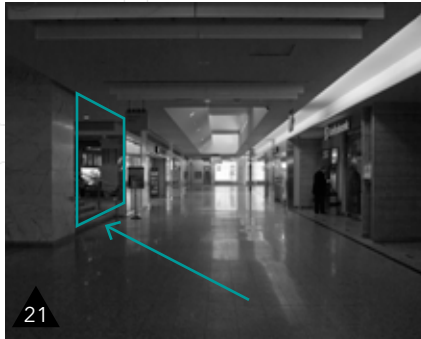
1/074 Scotia Plaza Concourse Level Exits



1/079 Commerce Court East Concourse Level



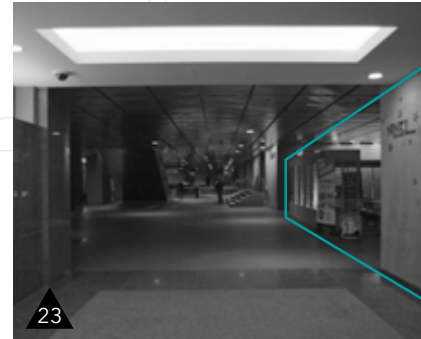
1/080 Wellington St W Tunnel, east of Bay St



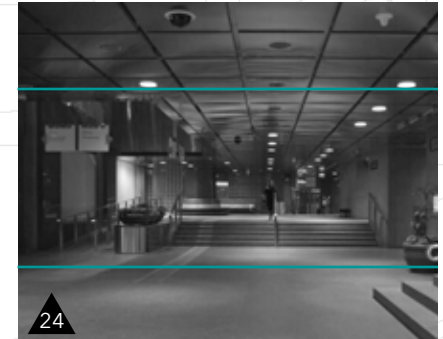
21
1/069 Bay Adelaide Centre



22
1/070 Adelaide St W Tunnel, east of Bay St



23
1/071 Scotia Plaza, Restaurant to the right



24
1/072 Scotia Plaza Elevator Lobby



27
1/075 King St W Tunnel, east of Bay St



28
1/076 Commerce Court North, Old Vaults



29
1/077 Commerce Court, Compass Floor Pattern



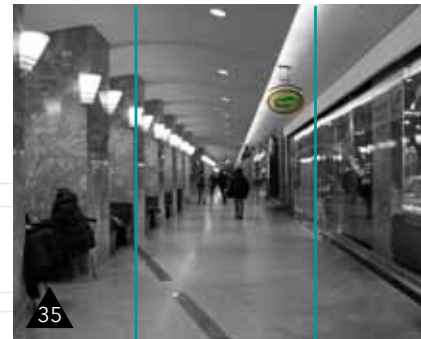
30
1/078 Commerce Court Food Court



33
1/081 Wellington St W Tunnel, east of Bay St



34
1/082 Brookfield Place, Hockey Hall of Fame left



35
1/083 Brookfield Place, Restaurant to the right



36
1/084 Brookfield Place







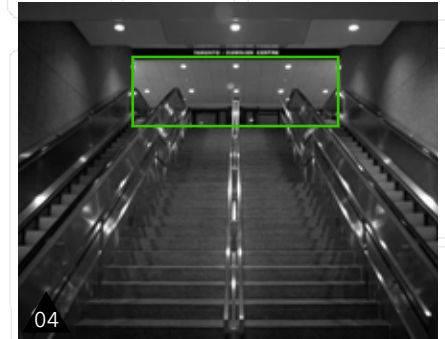
01
1/087 Royal Bank Plaza Entrance



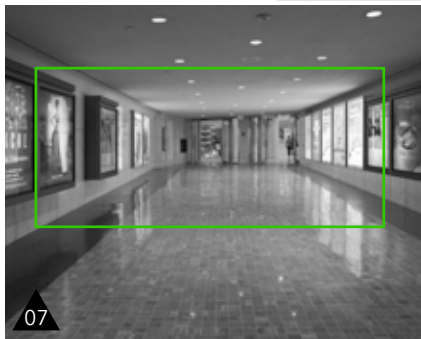
02
1/088 Royal Bank Plaza



03
1/089 Royal Bank Plaza



04
1/090 Wellington St W Tunnel, west of Bay St



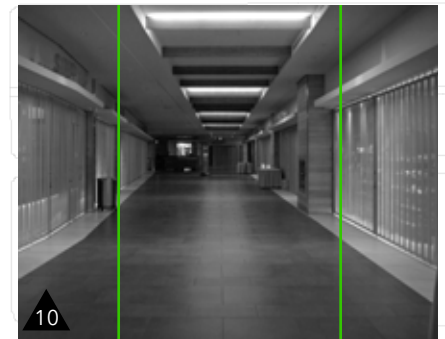
07
1/093 King St W Tunnel, west of Bay St



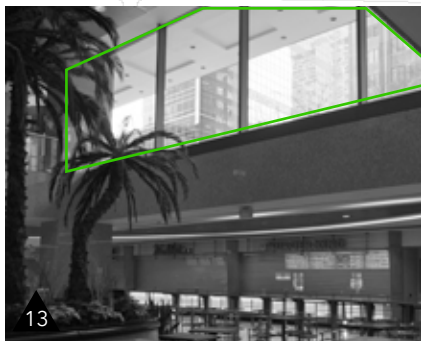
08
1/094 First Canadian Place



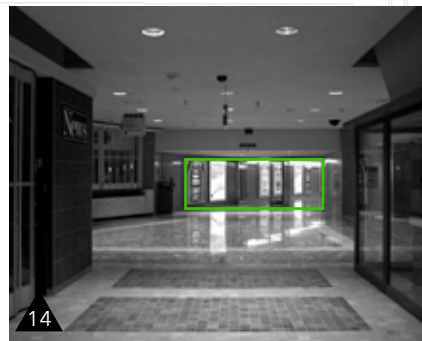
09
1/095 First Canadian Place



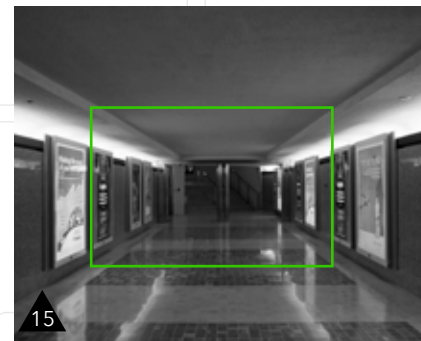
10
1/096 Exchange Tower



13
1/099 Exchange Tower Food Court



14
1/100 Exchange Tower

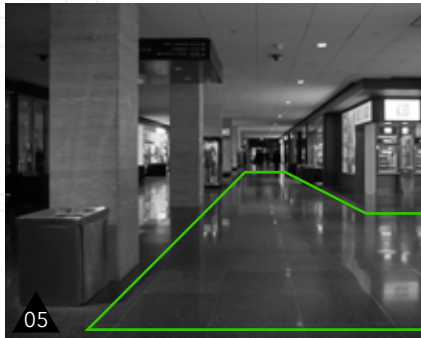


15
1/101 Adelaide St W Tunnel, west of Bay St



16
1/102 Richmond-Adelaide Centre Food Court

union station (w)



1/091 TD Centre



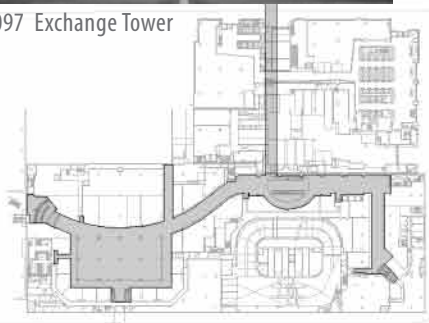
1/092 TD Centre



1/097 Exchange Tower

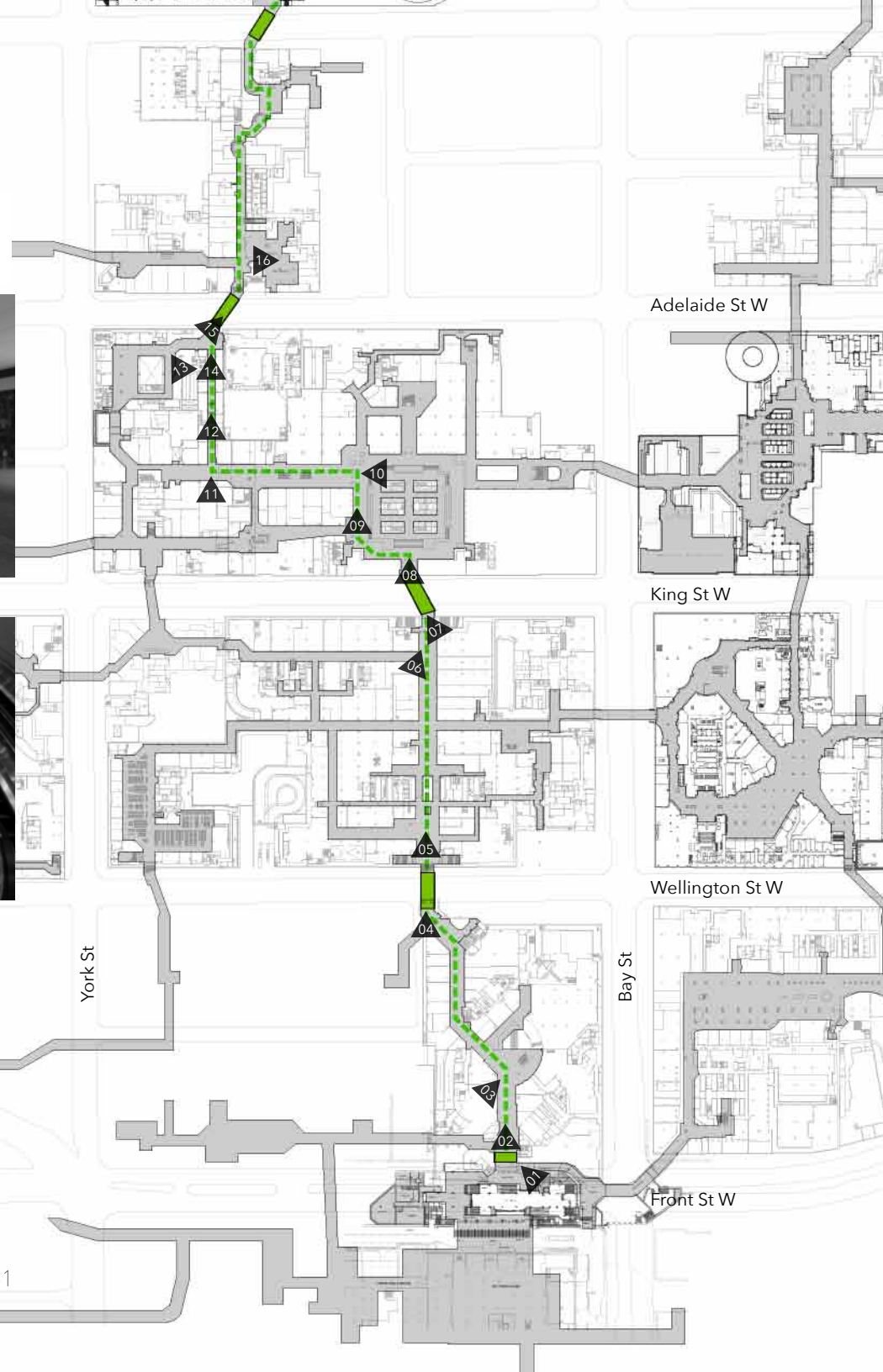


1/098 Exchange Tower



100m

1/103 Map of the Union Station Loop Westside Route



041



PATH

Richmond Adelaide Centre

150 York Street
DHS Tower
181 University Avenue
Toronto, Ontario

STARBUCKS COFFEE



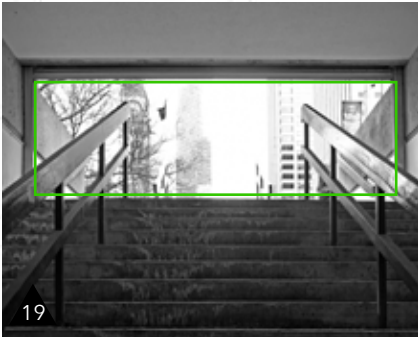
union station (w)



17
1/105 Richmond Adelaide Centre



18
1/106 Richmond St W Tunnel, west of Bay St



19
1/107 Queen St W Tunnel to City Hall Exit

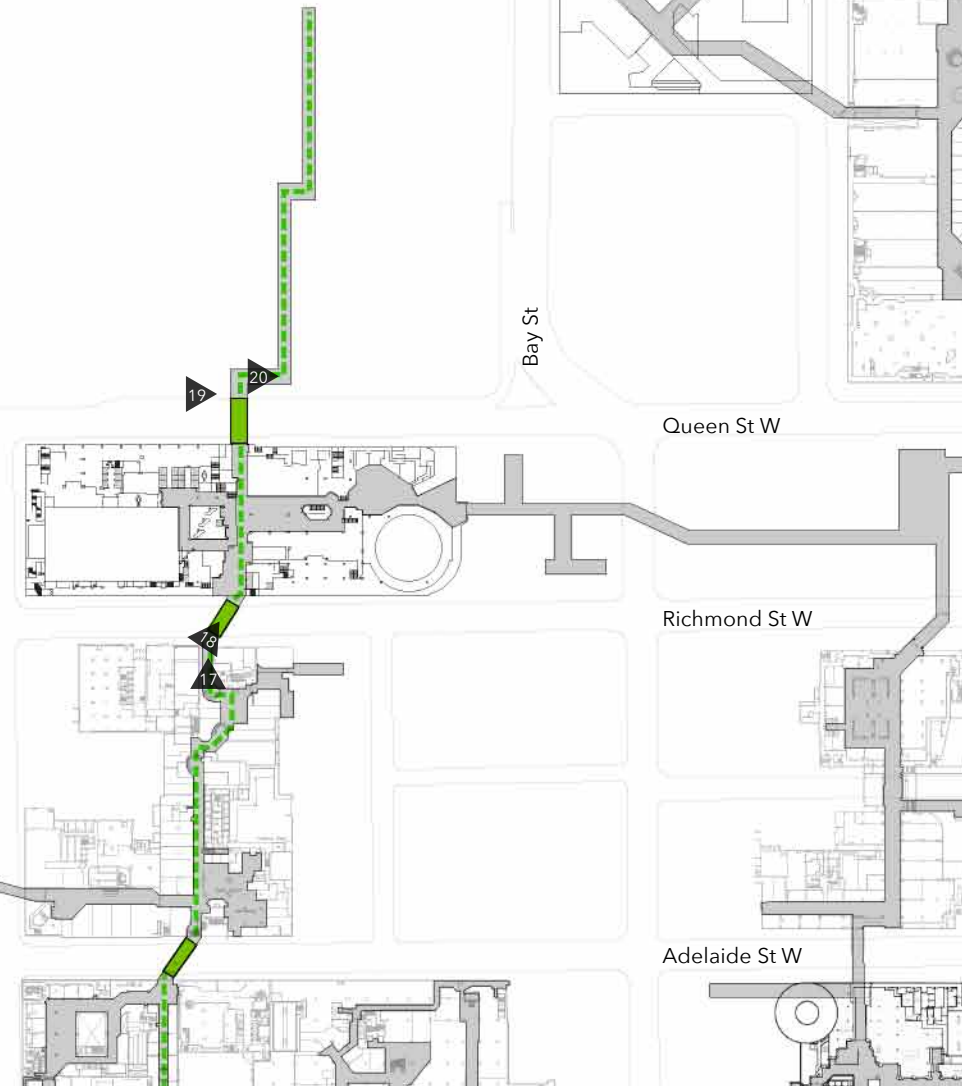


20
1/108 City Hall Parking Garage

100m

1/109 Map of the Union Station Loop Westside Route

043







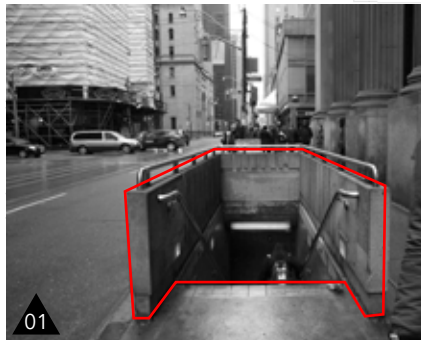
TD Centre



Commerce Court West
Court Shops

EXIT

king alley (n)



01
1/112 King Subway Station Entrance



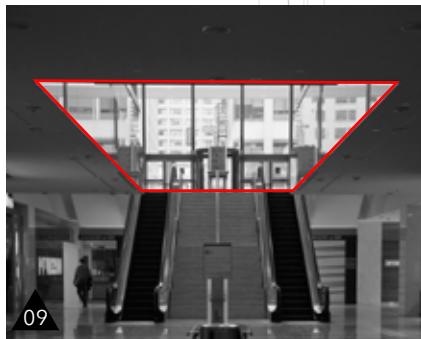
02
1/113 Yonge St Tunnel, north of King St



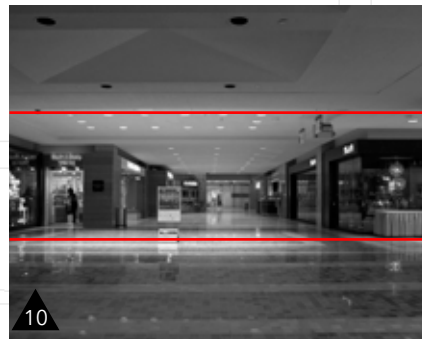
03
1/114 Yonge St Tunnel, north of King St



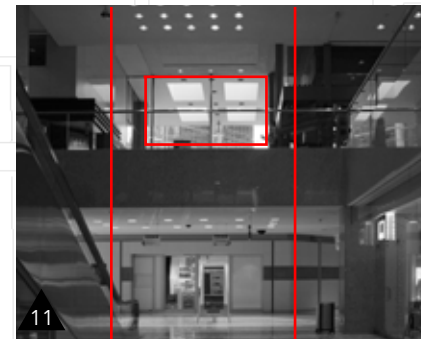
04
1/115 Yonge St Tunnel, north of King St



09
1/120 First Canadian Place



10
1/121 First Canadian Place



11
1/122 Exchange Tower



12
1/123 York St Tunnel, north of King St



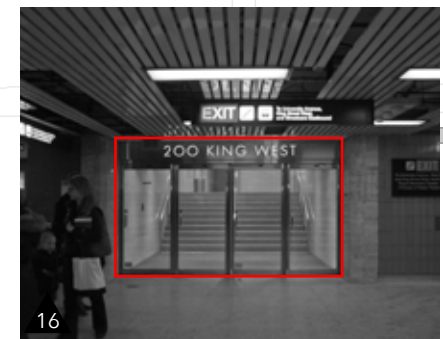
13
1/124 Sun Life Tower



14
1/125 Sun Life Tower



15
1/126 Sun Life Tower



16
1/127 St Andrew Subway Station



1/116 Scotia Plaza



1/117 Scotia Plaza

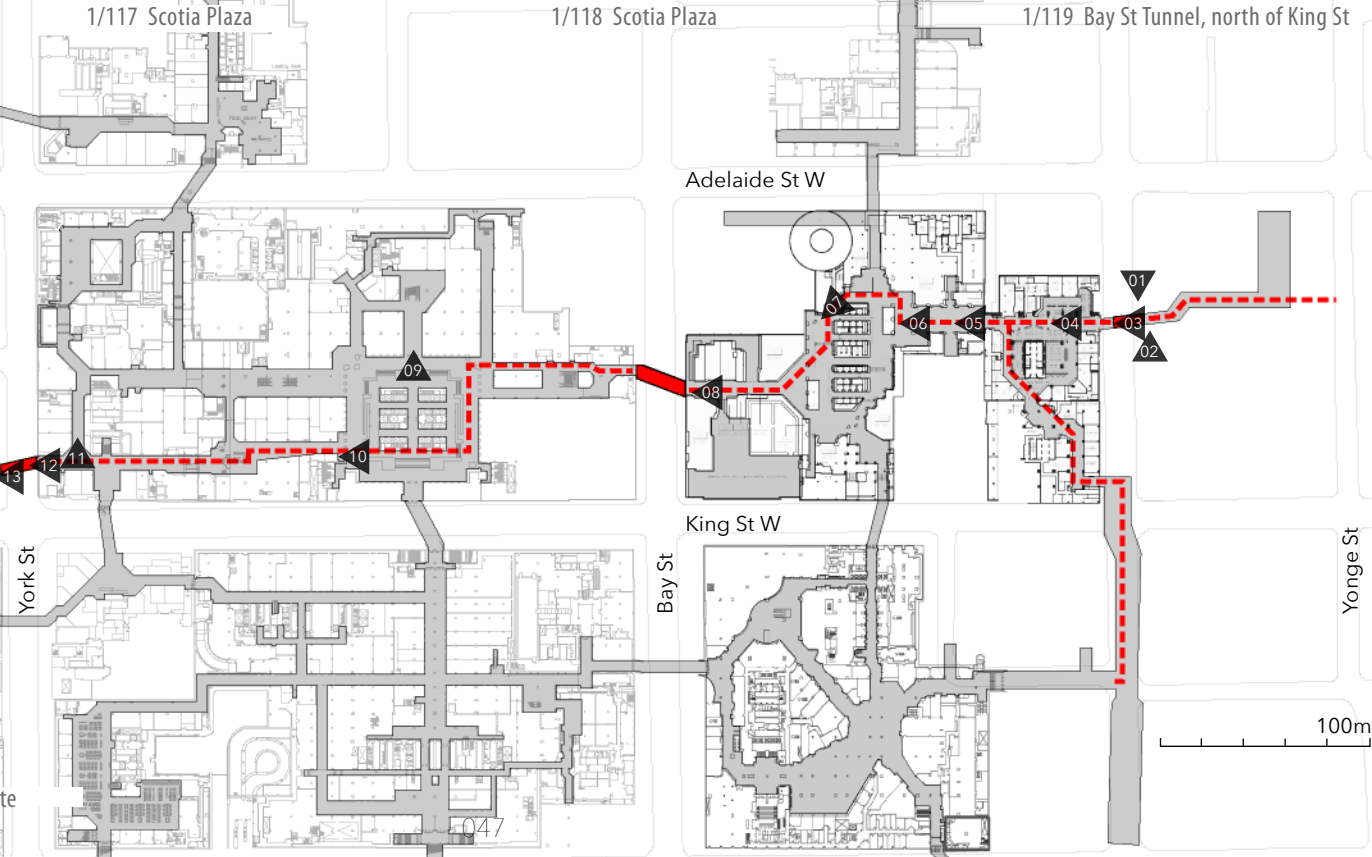


1/118 Scotia Plaza



1/119 Bay St Tunnel, north of King St

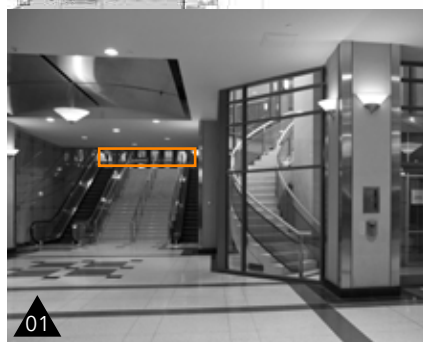
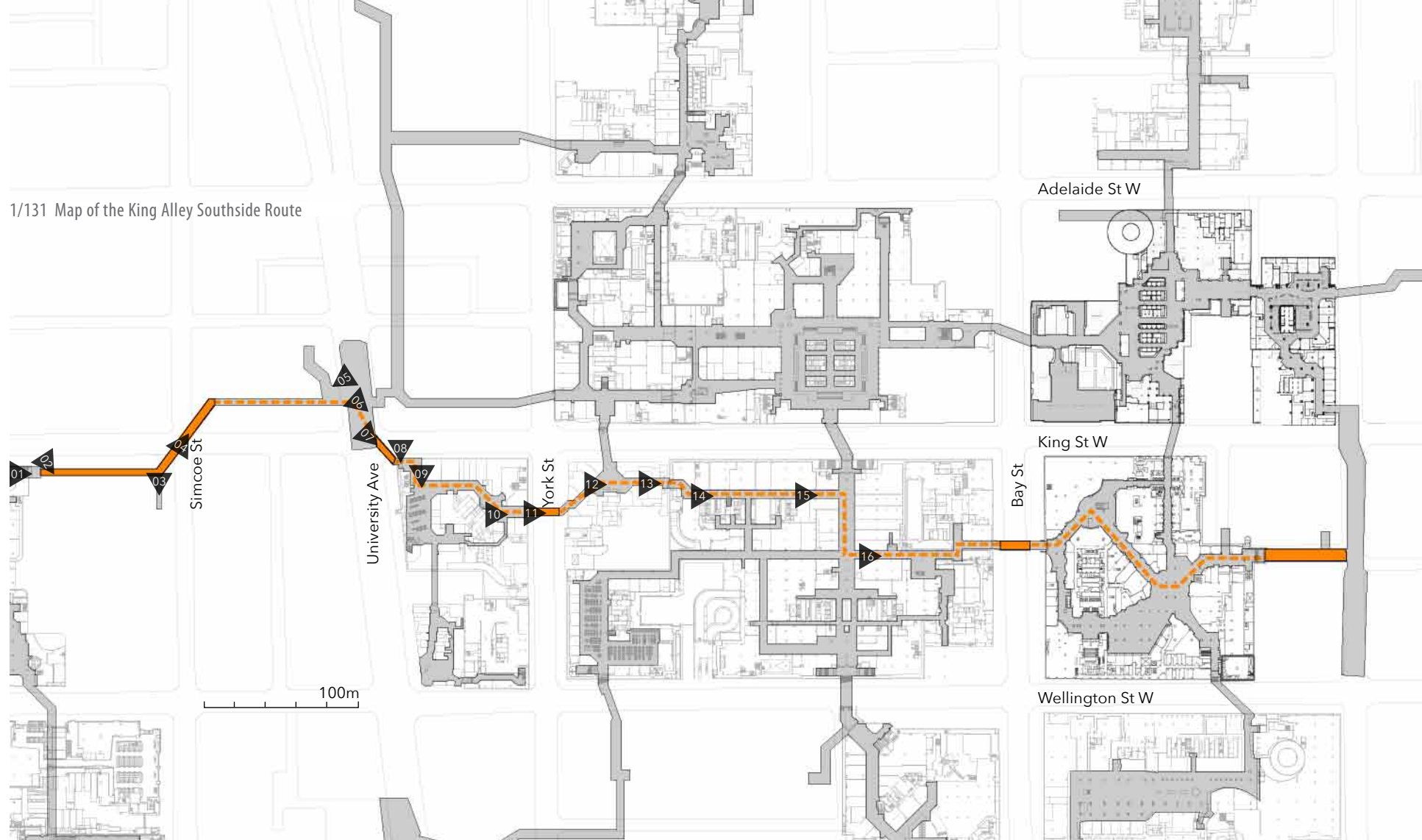
1/128 Map of the King Alley Northside Route



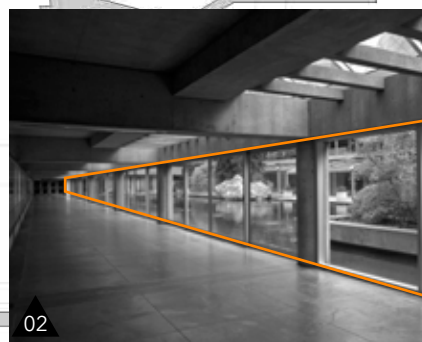




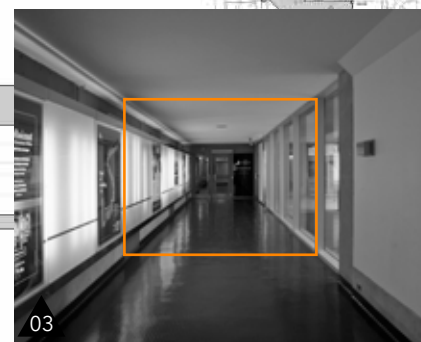
1/131 Map of the King Alley Southside Route



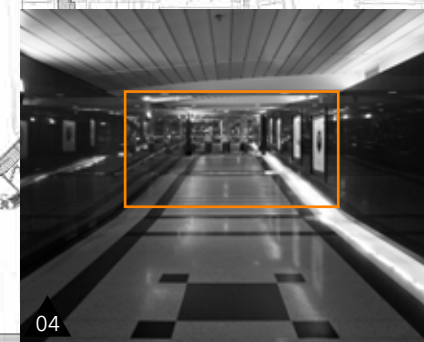
1/132 Metro Hall



1/133 King Sidewalk Tunnel



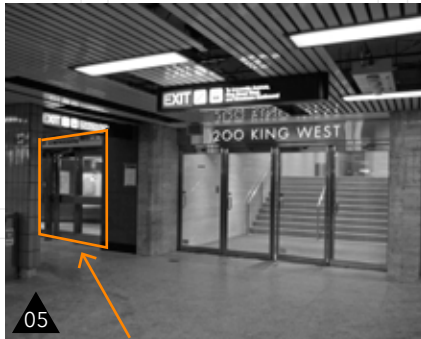
1/134 Tunnel to Roy Thompson Hall



1/135 Simcoe St Tunnel, south of King St

king alley (s)

Yonge St



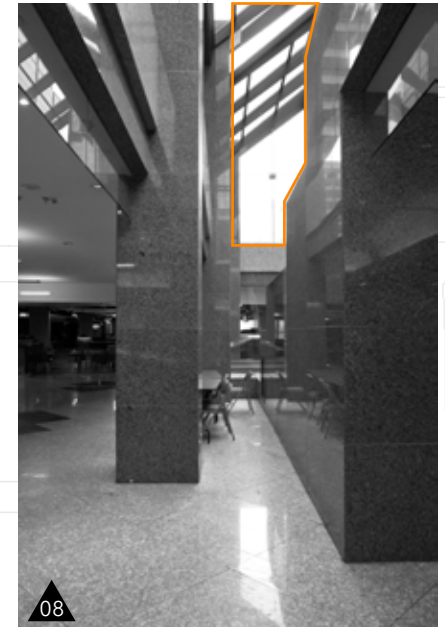
1/136 St Andrew Station



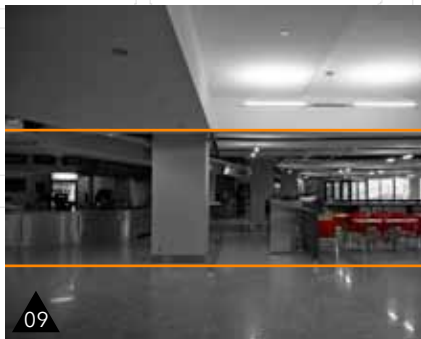
1/137 St Andrew Station



1/138 University Ave Tunnel, south of King St



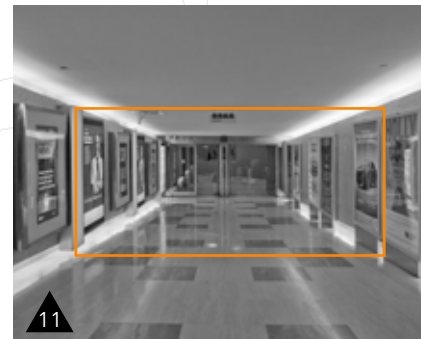
1/139 145 King St W



1/140 145 King St W Food Court



1/141 145 King St W



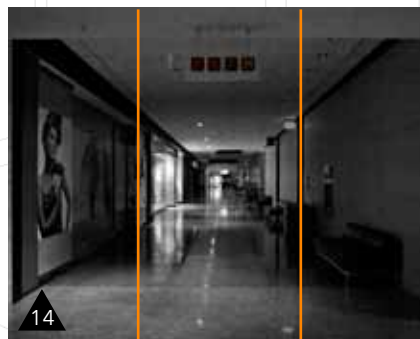
1/142 York St Tunnel, south of King St



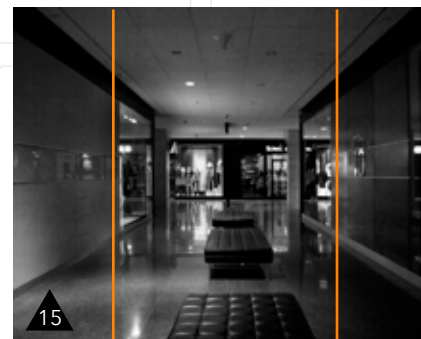
1/143 Standard Life Centre



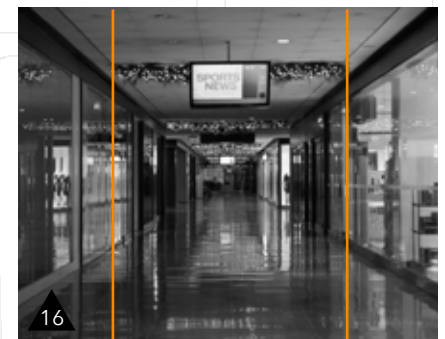
1/144 Standard Life Centre



1/145 TD Tower North



1/146 TD Centre



1/147 TD Centre



king alley (s)

1/149 Map of the King Alley Southside Route



1/150 TD Centre toward Commerce Court



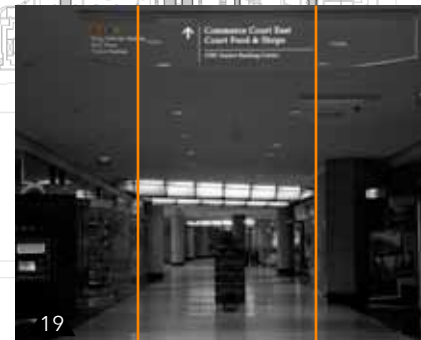
1/154 Commerce Court East



1/151 Bay St Tunnel, south of King St



1/155 Yonge St Tunnel, south of King St



1/152 Commerce Court West

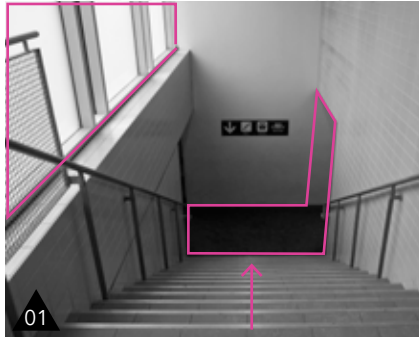


1/156 Yonge St Tunnel, south of King St



1/153 Commerce Court South

queen street



1/158 Osgoode Station Entrance from COC



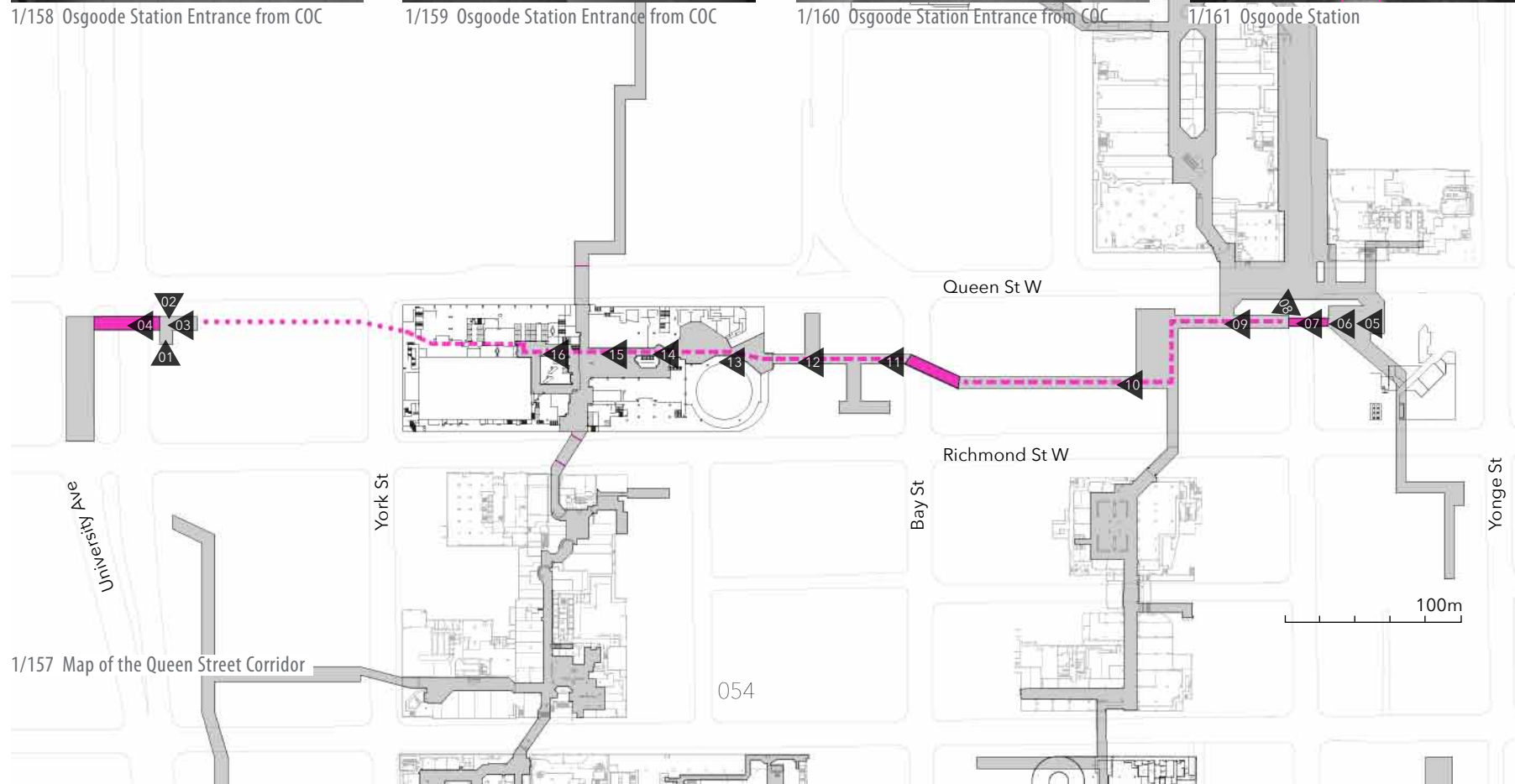
1/159 Osgoode Station Entrance from COC



1/160 Osgoode Station Entrance from COC

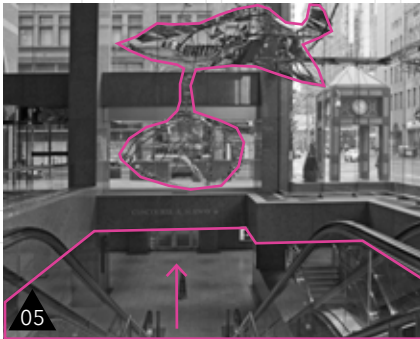


1/161 Osgoode Station



1/157 Map of the Queen Street Corridor

054



05
1/162 One Queen East



06
1/163 One Queen East



07
1/164 Yonge St Tunnel, south of Queen St



08
1/165 The Hudson's Bay Company



09
1/166 The Hudson's Bay Company



10
1/167 The Hudson's Bay Company



11
1/168 The Thomson Building



12
1/169 The Sheraton Centre Hotel



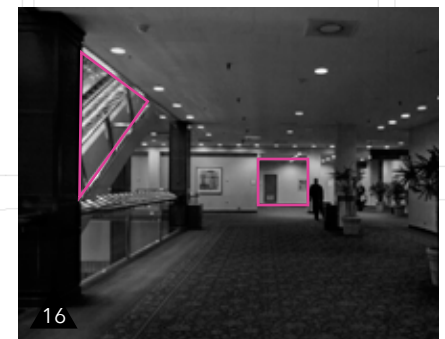
13
1/170 The Sheraton Centre Hotel



14
1/171 The Sheraton Centre Hotel



15
1/172 The Sheraton Centre Hotel

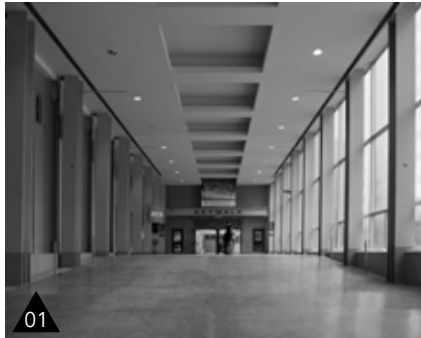


16
1/173 The Sheraton Centre Hotel





the waterfront



01
1/176 Entrance to the Skywalk



02
1/177 Union Pearson Express construction



03
1/178 The Skywalk



04
1/179 Bridge to the Delta Hotel



07
1/182 Bridge from ACC to 25 York St



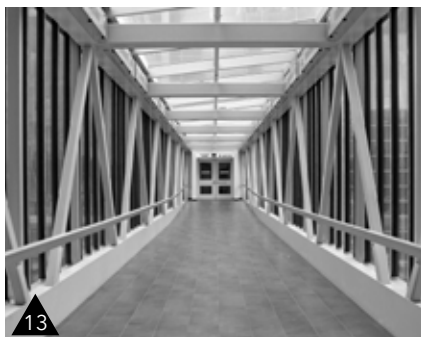
08
1/183 View of Bremner Blvd from Bridge



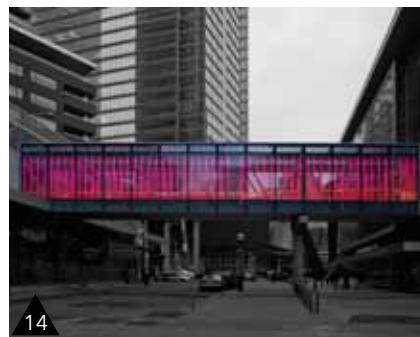
09
1/184 Tunnel from 25 York St to SFC



10
1/185 Entrance to South Financial Core



13
1/188 Bridge from ACC to Maple Leaf Square



14
1/189 Bridge from ACC to Maple Leaf Square



15
1/190 Bridge from ACC to RBC WaterPark Place



16
1/191 Bridge from ACC to RBC WaterPark Place



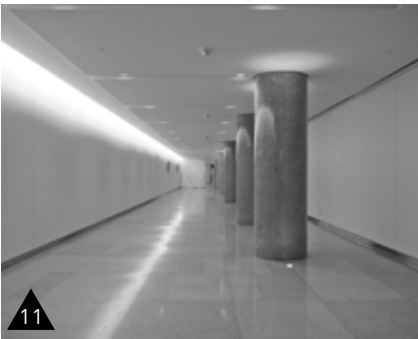
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1/180 Exit from the ACC



06

1/181 25 York St Lobby



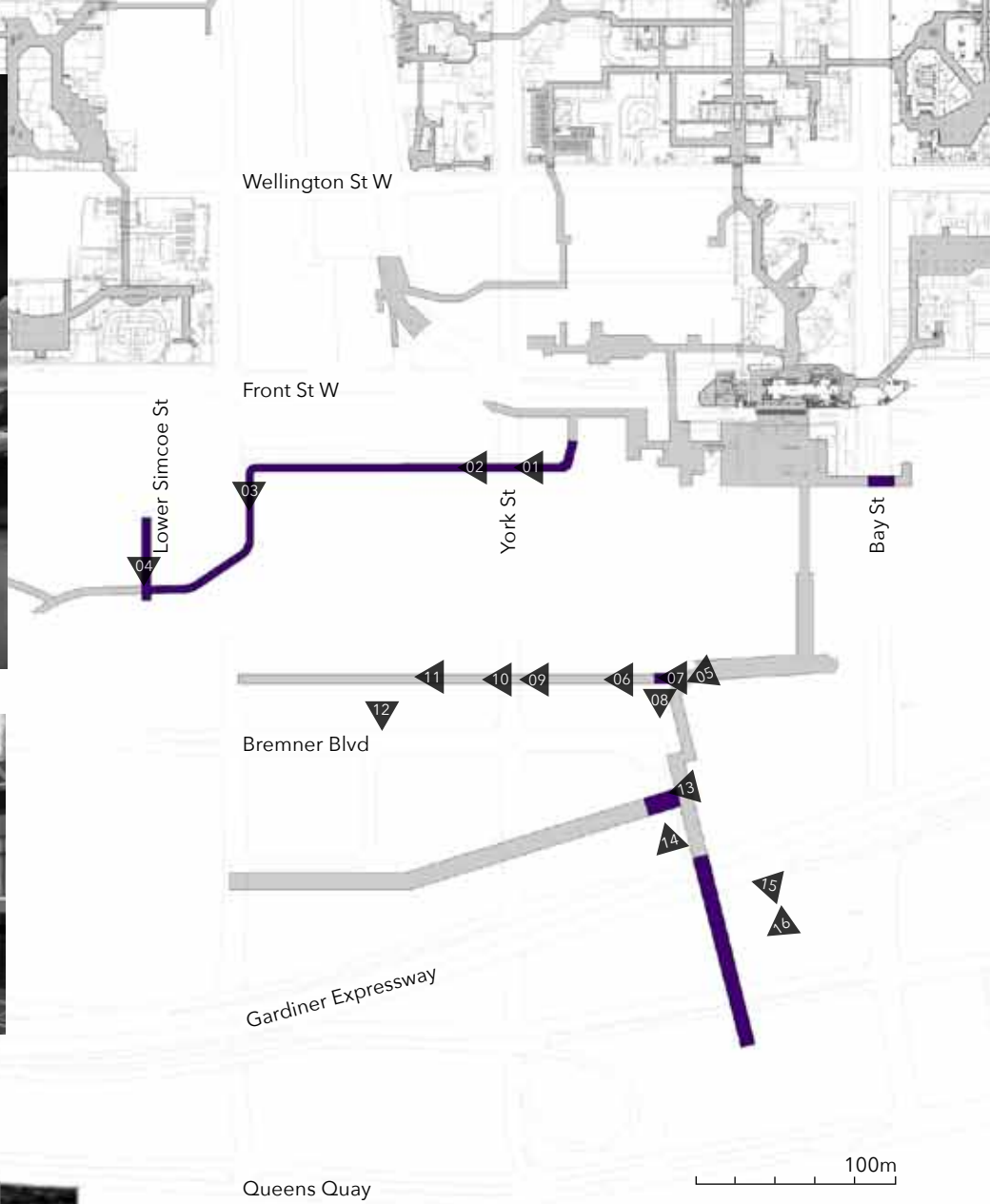
11

1/186 South Financial Core



12

1/187 South Financial Core



1/192 Map of the Waterfront Extension



toward a useful non-place

From its humble beginnings as an underground connection between two stores, the PATH has developed into a large fragmented non-place, illegible as a single entity.

This chapter illustrated the repeated lack of success in implementing standards that would render the PATH more user-friendly for travellers and the growing downtown population. Navigation remains a challenge to most in the continuous growth of the PATH. The PATH would benefit from an overarching order that encourages more user groups to

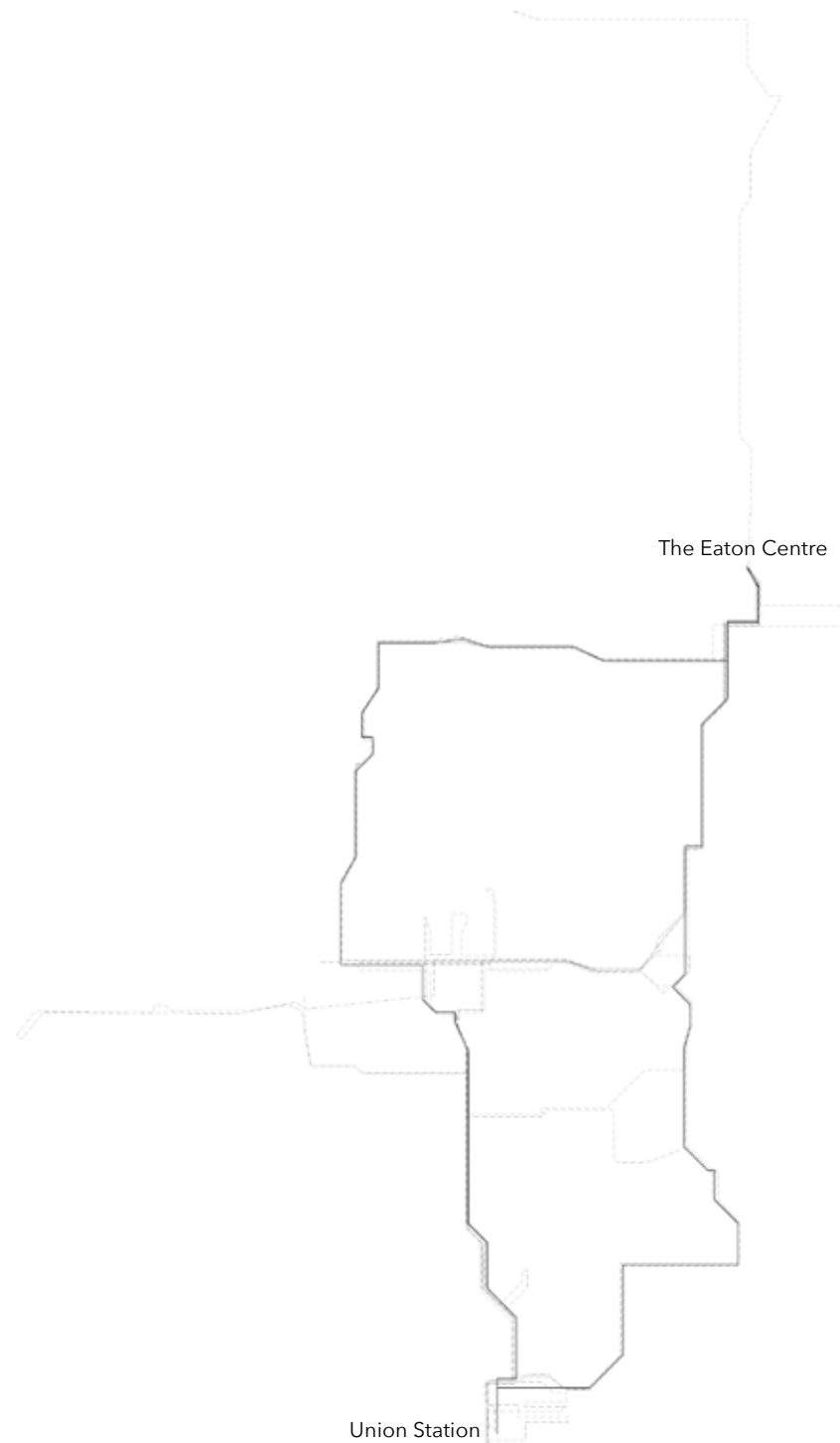
make full use of its numerous amenities.

As long as the PATH remains under private ownership, design and maintenance is out of the public jurisdiction and the PATH cannot develop as the city streets above.

Through the detailed photographic analysis of the PATH, four key routes punctuated by the understreet tunnels manifest ideal sites for redesign, to give a logical and unified pattern to this confusing system. These routes will be further investigated in the next chapter.

chapter one: end notes

1. Amina Menkad and Frances Woo. "Toronto's PATH Pedestrian Network Master Plan: Rationale, Formation, and Implementation." Paper for PLA1101. University of Toronto, Department of Geography and Planning, 2014, 8.
2. "Exploring the PATH system downtown: in videos, pictures and history" Jan. 21, 2013. <http://pinkmafia.ca/blog/2013/01/21/whats-good-neighbourhoodpath-system-in-downtown-toronto/>
3. Ibid.
4. "Transit Toronto: Public Transit in the GTA Yesterday, Today and Tomorrow." last modified May 6, 2015, <http://transit.toronto.on.ca/>
5. Different sources have different dates for the Union Station to Royal York Hotel tunnel. 1929 was selected because that marked the opening of the Royal York Hotel. 1986 Underground report states 1924, other sources state 1927.
6. "Transit Toronto: Public Transit in the GTA Yesterday, Today and Tomorrow." last modified May 6, 2015, <http://transit.toronto.on.ca/>
7. Ibid.
8. Robert Fulford, *Accidental City: The Transformation of Toronto*. (New York: Houghton Mifflin (Trade), 1995), 43.
9. Toronto Dominion Centre Limited, "Toronto Dominion Centre", promotion pamphlet, undated.
10. Lindy Goodman. "Streets Beneath the Towers: The Development of Toronto's Downtown Underground Pedestrian Mall System." Discussion Paper Number 31. Toronto: Dept. of Geography, York University, 1984, 10.
11. Ibid, 40.
12. Newton Frank Arthur Inc. and Agnew Communications Inc. "Toronto's Underground City." prepared for City of Toronto Planning and Development Department, July 1986, 3.
13. City of Toronto. Plan for Downtown Toronto: Supplementary Report. Toronto: 1963. [City of Toronto Archives, Fonds 220, Series 10, Item 162.]
14. Mary Wiens. "Pedestrian bridge forms first PATH connection to waterfront." CBC News Toronto, Aug 15, 2014
15. Corbett, Harvey Wiley. "Mostly street widenings as Manhattan crowds increase, might be obliterated by planning this kind of thoroughfare." *The New York Tribune*, January 16, 1910.
16. Amina Menkad and Frances Woo. "Toronto's PATH Pedestrian Network Master Plan: Rationale, Formation, and Implementation." Paper for PLA1101. University of Toronto, Department of Geography and Planning, 2014, 15.
17. Urban Strategies Inc. "Design Guidelines: for PATH and Other Climate-Controlled Pedestrian Networks." [City of Toronto], Feb. 16, 2012, 11.
18. Newton Frank Arthur Inc. and Agnew Communications Inc. "Toronto's Underground City." prepared for City of Toronto Planning and Development Department, July 1986, 9.
19. Ibid, 6.
20. Ibid, 5.
21. Lindy Goodman. "Streets Beneath the Towers: The Development of Toronto's Downtown Underground Pedestrian Mall System." Discussion Paper Number 31. Toronto: Dept. of Geography, York University, 1984, 10.



chapter two: traversing

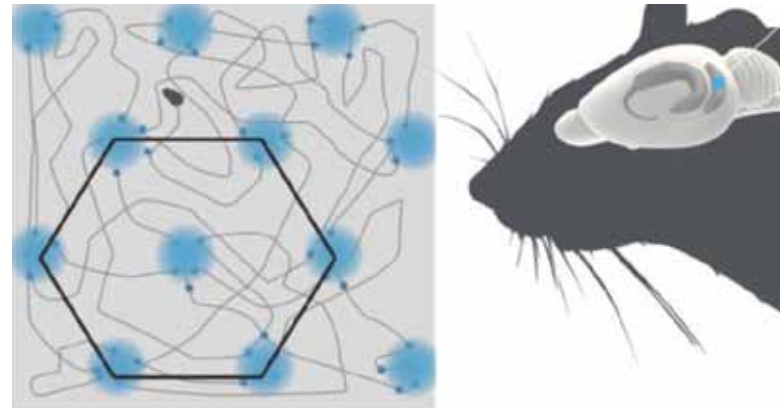
Complete chaos without a hint of connection is never pleasurable.
– Kevin Lynch *Image of the City* 1960

Even with a map and signage system, traversing the PATH is a case of navigational gymnastics. As demonstrated in the photographs of the previous chapter, spatial monotony results in confusion.

Here, spatial orientation is investigated through experiential means, experimental means, and expert knowledge. Research into the physiological processes of encoding spatial information leads to a design strategy based on the hypothesis that memory is enhanced by stimulating the senses at anticipated intervals.

Two navigational experiments were performed. In both, the subjects were asked to find their way from Union Station to the Eaton Centre, the most popular route among visitors using the PATH for the first time. The first experiment took place in the summer where I followed and conversed with each of the subjects to capture their impression of the space through narrative and a photomontage. The second experiment took place in the winter where I followed and observed a different set of subjects, as each were instructed to draw a cognitive map afterwards of the route.

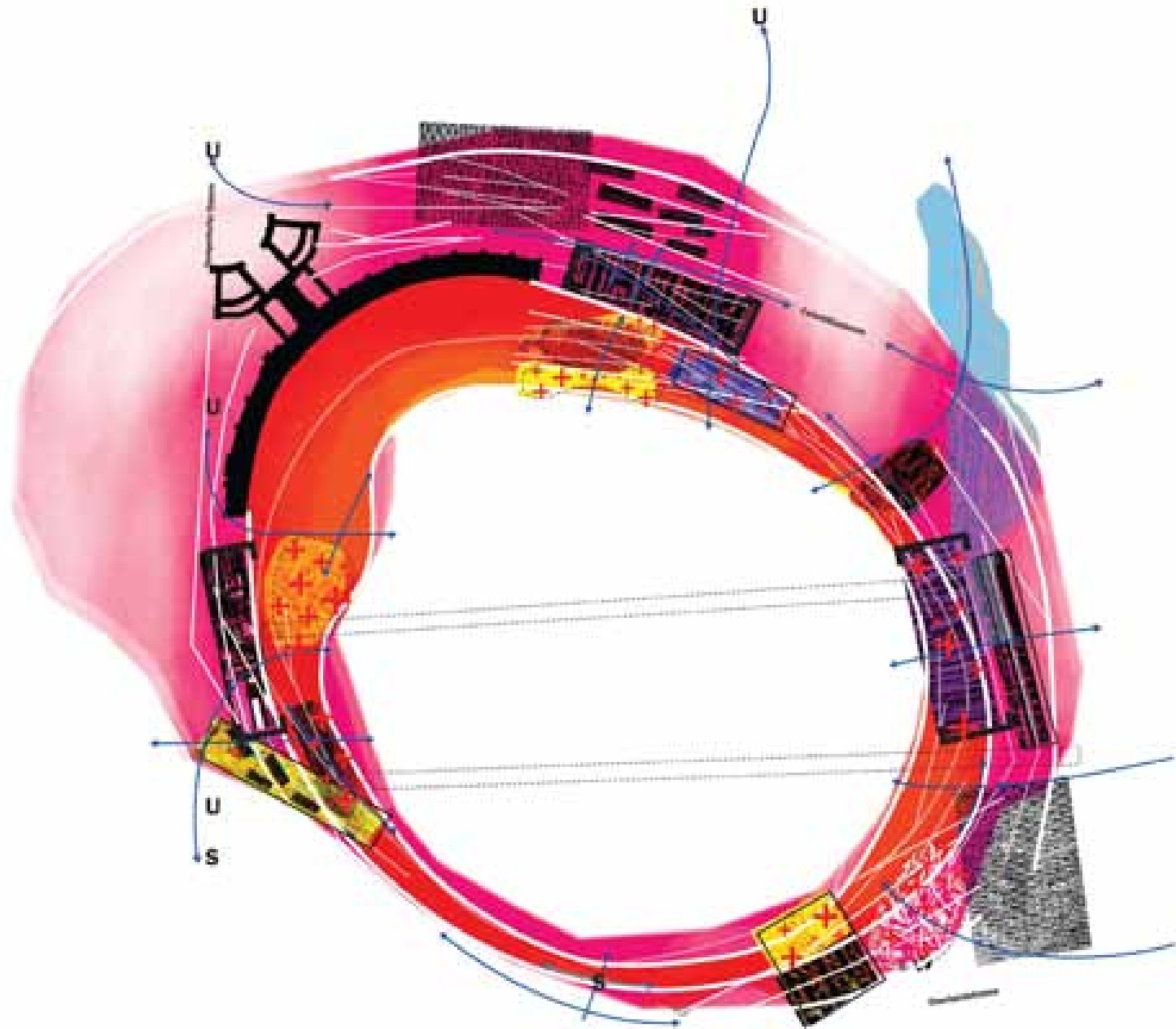
Human spatial orientation depends on two systems of information coding: place cells record places that are perceived as special while grid cells intake spatial information at regular



2/002 Diagram of How Grid Cells Work in Spatial Orientation

intervals.¹ Based on the maps produced, there are few memorable nodes in the PATH, making spatial orientation and recalling a specific route challenging through either of the coding systems.

The understreet tunnels of the PATH are the only spaces that occur at regular intervals with volumetric consistency. A redesign using a route-specific system of colours, textures, sounds and scents will form a cohesive pattern and intensify the encoding of spatial memory. The tunnels will become artificial nodes within the user's personal cognitive map, reducing the learning curve of navigating the PATH.



PATH: impressions

Experiment #1: Capturing the Experiential Impression

Purpose

Having a terrible sense of direction myself, the purpose of this experiment was to observe others navigate the PATH to gain perspective on how the space is read by the general public.

Background Research

According to French anthropologist Marc Augé, transient spaces like the PATH are alienating to the individual and are termed “non-places” as they do not hold enough significance to qualify as a place. “Non-places” are abundant in the globalized environment and present as difficult sites for intervention to architects and designers. But how does the average person view the PATH?

Hypothesis

Subjects will choose one of two routes to get from Union Station to the Eaton Centre. Route #1 is the most direct route through the Bay Adelaide Centre, open since 2009. Route #2 is the old route that veers around the Sheraton Centre, open since 1984.

Route #1: East to Brookfield Place, north to Commerce Court, north to Scotia Plaza, north to Bay Adelaide Centre, north to the Hudson’s Bay Company, northeast through Queen Subway station into the Eaton Centre.

Route #2: North to Royal Bank Plaza, north to TD Centre, north to First Canadian Place, northwest through the Exchange Tower, north to Richmond Adelaide Centre, north to Sheraton Centre, east through the Thomson Building, east through the Simpson Tower, east through the Hudson’s Bay Company, northeast through Queen Subway into the Eaton Centre.

Experiment

Six subjects were observed, the last two as a pair, using the

PATH to travel from the main hall on the ground level of Union Station to the Eaton Centre. The subjects had a varying range of experience with the PATH from first-time users to users with over ten years of experience. The subjects were allowed to use maps and signage within the PATH to guide their way. They were also allowed to ask strangers for direction. I followed and observed their process.

During the walk, subjects would impart their past experience with the system if they had any. After the walk, subjects were asked to recall anything memorable to them.

Data + Analysis

The start and end times of the walk were recorded and compared to the street level walk time of 13 minutes according to Google Map walking directions. Based on observations of and conversations with the subject(s), a narrative of the experience was written along with a surreal visual representation of the subject’s impression of the PATH and a line delineating the route taken.

Conclusion

Like the public streets aboveground, there are many possible routes to get from Union Station to the Eaton Centre. Unless a subject has experienced knowledge of the PATH, it is not apparent which route is the most direct. Even subjects with much experience get confused because the retail aspect of the PATH is ever-changing.

Each subject gravitated to different aspects of the PATH based on past experience with either the PATH or other shopping centre spaces. There were virtually no memorable aspects to the PATH save for the abundance of Starbucks used as common meeting places among the office workers.



The Eaton Centre

chris: no legibility

Subject 01: First-time user Chris is male, age 34, originally from the USA, has lived in Mississauga since 2002.

Saturday, August 16, 2014, start 1:45pm, end 2:34pm, 51 mins

Chris and I enter the main hall of Union Station and descend the stone steps into the chaotic underground. Artificial lights, an immediate compression of space, we are in the midst of a sea of people rushing in this, that and the other direction. I tell him that the experiment starts from here. Here? Where?

Chris moved to Mississauga from Texas in 2002. He has never heard of the PATH. There are signs everywhere but none that seem useful to him. Since Chris doesn't know anything about the PATH, I give him a clue. I point out the PATH logo on a temporary sign mixed in with directions on how to get to the TTC. "There are maps throughout the PATH system," I tell him, not expecting him to find one in the concourse of Union Station.

He scans the space and two minutes later, we are standing in front of a map of the PATH.

"Where's the 'You are here' dot?" he asks.

There would be none on most of the PATH maps. He studies the map, circles inside and outside of Union Station before

resorting to look at the compass app on his phone. Following the north arrow on his compass, he finally breaks out from the station. The compass becomes useless when we enter First Canadian Place and have to choose east or west in order to continue north to the Eaton Centre.

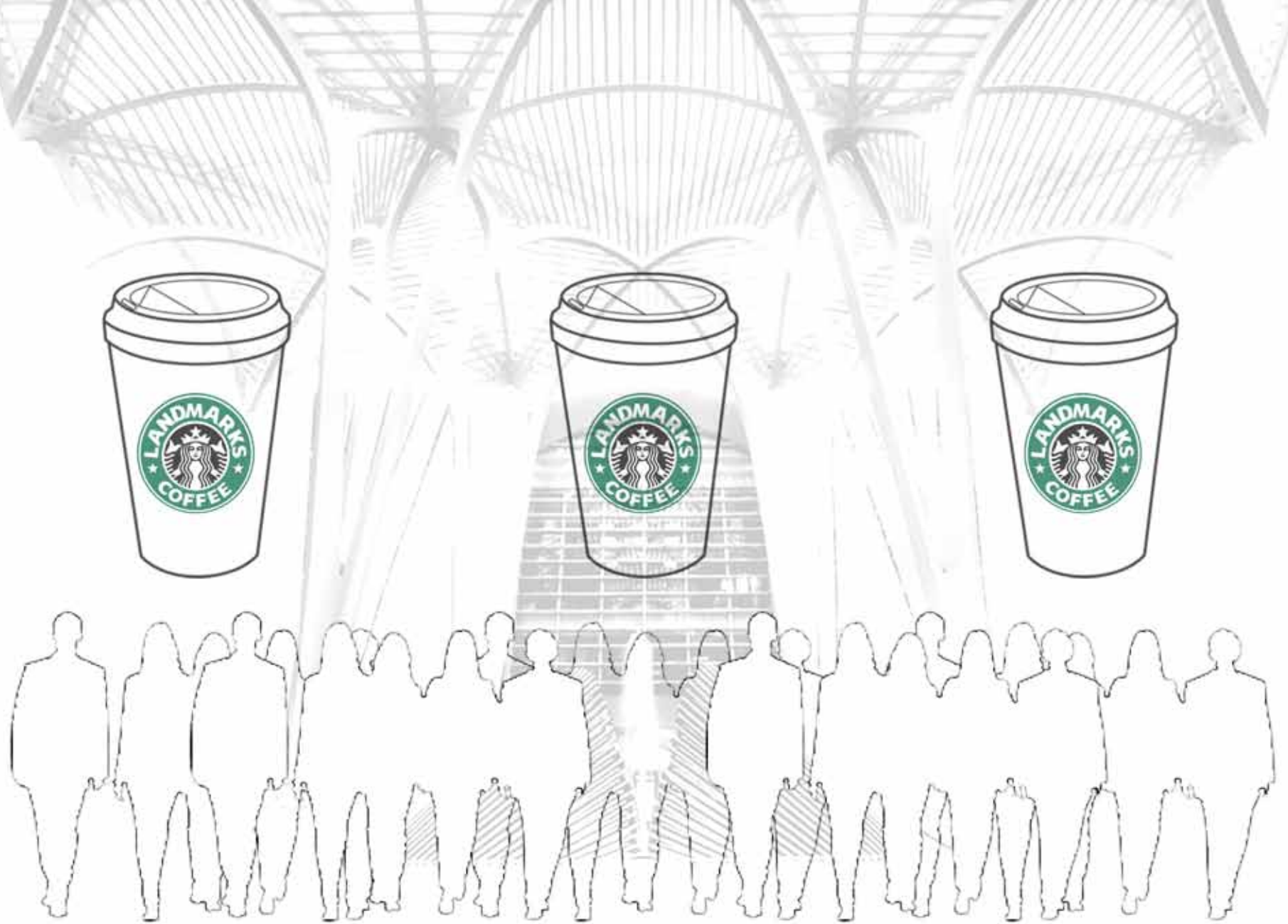
"Why are all the shops closed?" He wants to buy bed sheets for his new home. The PATH, which has the appearance of a shopping mall, is a ghost town on the busiest shopping day of the week. "This place is not well-advertised."

At 2:09pm, we enter The Bay. He thinks he is close to the end and uses the washroom before shopping for his bed sheets. We leave The Bay and end up at One Queen East. Chris is confused. It takes him a full seven minutes to retrace his steps and find his way into the Eaton Centre.

The Moral of the Story

Do not be fooled: the PATH reads like a mall but does not adhere to the conventions that make that typology legible to the general public. Symbolic representation of spaces through maps are only useful if there is a quick frame of reference, like a "You are here" dot, for the user.





The Eaton Centre

catherine: no permanence

Subject 02: Experienced user Catherine is female, age 34, lives in downtown Toronto. She has worked in the various buildings in the Financial District since 2001.

Friday, August 22, 2014, start 11:52am, end 12:07pm, 15 mins

We meet in the lobby of 130 King West where Catherine works. I stand by a glass railing overlooking a Starbucks wondering how to reach it. Catherine leads me to a narrow staircase hidden by massive elevator banks and heads to Union Station.

"I could show you the new way to Eaton Centre, we'll grab a bite and then I could take you through the old route from the Eaton Centre back here," she says confidently.

In the early 2000s, Catherine was a student at the University of Waterloo. Her career was built in these office towers. At first, she used the PATH to get from the subway to her building. When she was required to attend client meetings in adjacent buildings, she learned specific routes in the PATH from her boss.

I ask if she uses the signage.

"Only to confirm that I'm heading in the right direction."

A Toronto guidebook highlighted the artwork in the PATH. I wonder where the common meeting places are. The terrazzo compass at Commerce Court? The fountain at Brookfield Place?

"Starbucks near Union Station," is her answer. There are three. We approach Union Station from the Royal Bank Plaza: Starbucks

#1. Coming out of the long tunnel that connects to Brookfield Place: Starbucks #2. Through a bustling Allen Lambert Galleria: Starbucks #3.

"This is the one that we meet at because it's got the most seating." It even has natural light beaming down from the atrium.

Commerce Court, Scotia Plaza, the Bay Adelaide Centre.

"There used to be a wall here," Catherine points to the edge of Scotia Plaza. For years she misread the PATH map, which had the route marked as future expansion.

I ask if the old route has fewer users now.

"There's just a lot more people downtown," Catherine says. Ten years of waterfront condo construction has increased the population. Catherine moved from the suburbs in recent years.

"Do you come here on weekends?"

She makes a face. "There's no reason to."

After lunch at the food hall in basement of The Bay, we walk through the dated interior of the Sheraton Centre and proceed to the newly renovated Richmond-Adelaide Centre.

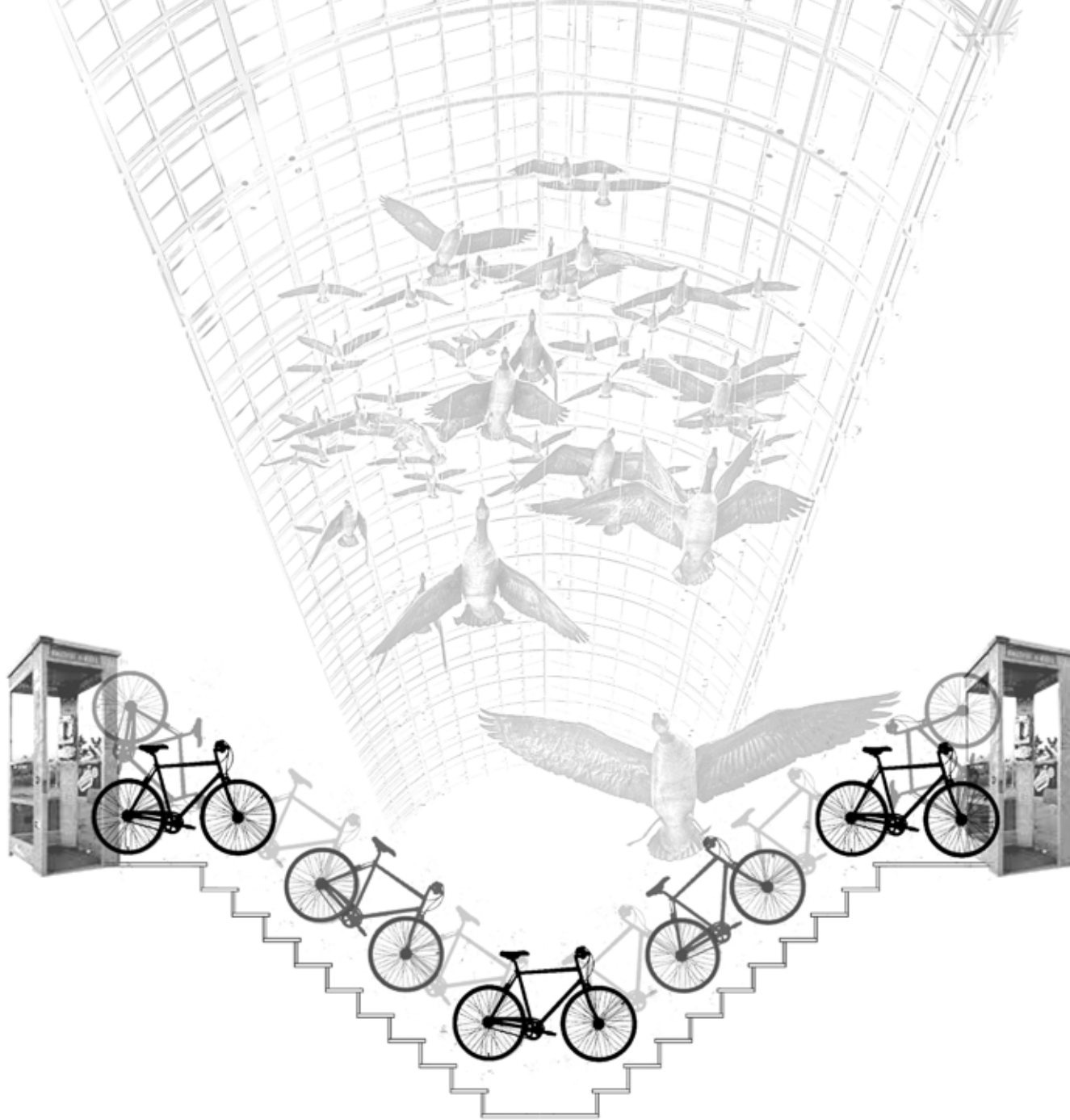
"Is this the old route?" she questions. She is confused.

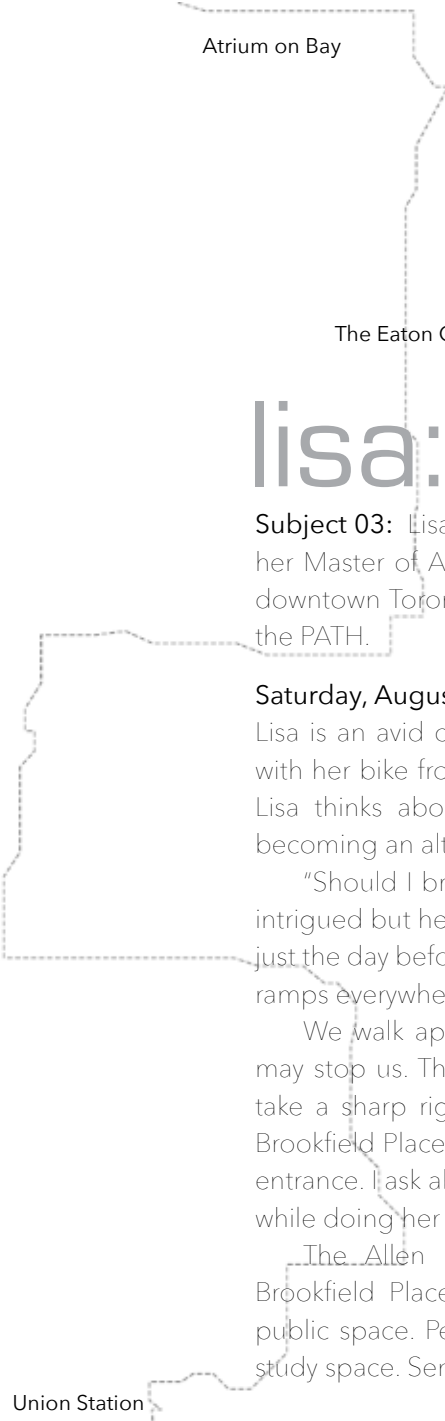
The Moral of the Story

Be humble: the PATH's many changing faces play tricks on the memory and resist being mastered. Coffee shops are the only identifiable nodes in the PATH.

130 King St W

Union Station





Atrium on Bay

The Eaton Centre

lisa: bike PATH

Subject 03: Lisa is female, age 34, from Germany where she did her Master of Architecture thesis on the PATH. She has lived in downtown Toronto since 2008 and in 2013 led a Jane's Walk in the PATH.

Saturday, August 23, 2014, start 3:12pm, end 3:33pm, 21 mins

Lisa is an avid cyclist. We have Saturday brunch before walking with her bike from Adelaide and Portland toward Union Station. Lisa thinks about parking. I tell Lisa in jest about the PATH becoming an alternative route for bicycle couriers.

"Should I bring my bike into the PATH?" Lisa suggests. I am intrigued but hesitant to accept as she recovered from back pain just the day before. "It's wheelchair accessible, so there should be ramps everywhere," Lisa affirms.

We walk apprehensively with the fear that a security guard may stop us. Through the crowded chaos of Union Station, we take a sharp right turn into a long and angled tunnel toward Brookfield Place instead of straight through the Royal Bank Plaza entrance. I ask about her choice. This was the route she practiced while doing her studies on the PATH.

The Allen Lambert Galleria, the underground space in Brookfield Place, holds a special designation as an enclosed public space. People sit here at all hours. Students use it as a study space. Senior citizens read their newspapers.

We encounter our first hurdle at Commerce Court. No ramp: either five steps or an elevator made to fit a wheelchair. A choice faced again and again on the route. I imagine the bicycle rearing on its hind wheel. Could Lisa squeeze in? Would holding up a bicycle be worse for her back? She opts for the stairs.

We scurry from deserted building to deserted building. Rarely do we see anyone. We pass a security guard or two. No one cares that we have a bicycle indoors.

The concourse of First Canadian Place has a series of white stone steps that lead up to Scotia Plaza. I pause, vaguely recalling a parallel route without steps. Lisa already has the bicycle on her shoulder. As we exit the last empty office tower, it dawns on Lisa that she will have to drag the bicycle through the merchandise at The Bay and the Saturday afternoon crowd at the Eaton Centre.

At the mall, there are no bicycle-accessible exits to the street. Lisa decides to come out of the Atrium on Bay. A three metre high concrete staircase separates us from the sidewalk.

The Moral of the Story

All wheels are not equal: wheelchair accessibility is not the same as bicycle accessibility. The PATH already has underground parking for cars, it could expand to include underground bicycle parking.

Union Station



gavin: contemplation

Subject 04: First-time user Gavin is male, age 32, from Scotland, has lived in Toronto since 2012.

Sunday, Sept. 14, 2014, start 2:21pm, end 2:45pm, 23 mins

It's nearly 2pm when we meet at the corner of John and Richmond. Following my lead, we almost get lost heading to Union Station. I blame my terrible sense of direction.

We arrive in the construction chaos, I say to pretend I'm not here. He asks a lady in a traffic vest for directions to the PATH. Stunned at the unexpected question, she points to a long ramp with no signage. After walking blindly for two minutes, signs for the PATH appear. We enter the Royal Bank Plaza.

"Just head north," Gavin reasons as the Eaton Centre is north of Union Station. The PATH has many twists and turns, which could drive you off course time and again.

Gavin consults a PATH map and uses the corresponding signage. He glides effortlessly over the smooth terrazzo floors. The signs list buildings that are directly adjacent to the one you are in. The signs do not tell you which way will eventually get to the Eaton Centre. Still, Gavin does not revisit the map.

"How are you doing this?" I ask but he does not answer. He focused on speedily accomplishing the task at hand. At Scotia Plaza, he pauses in front of empty shoeshining chairs.

"How do I find this place again?" he asks. He wants to get his shoes shined. I point to the Second Cup directly across from the shoeshining chairs. It is usually a busy meeting point on the weekdays. It appears dark and abandoned today.

"Remember this Second Cup," I instruct. Gavin would later confess that he got lost trying to find the shoeshining chairs.

A mere ten minutes since the start of the experiment and he races into the Richmond-Adelaide Centre via First Canadian Place. With the next building being the Sheraton Centre Hotel and the promise that Queen Street is nearby, he finds a bench and sits.

"Why are you stopping?" I ask.

"Because I don't want this to end," he says. "This place is so peaceful. Thanks for bringing me here."

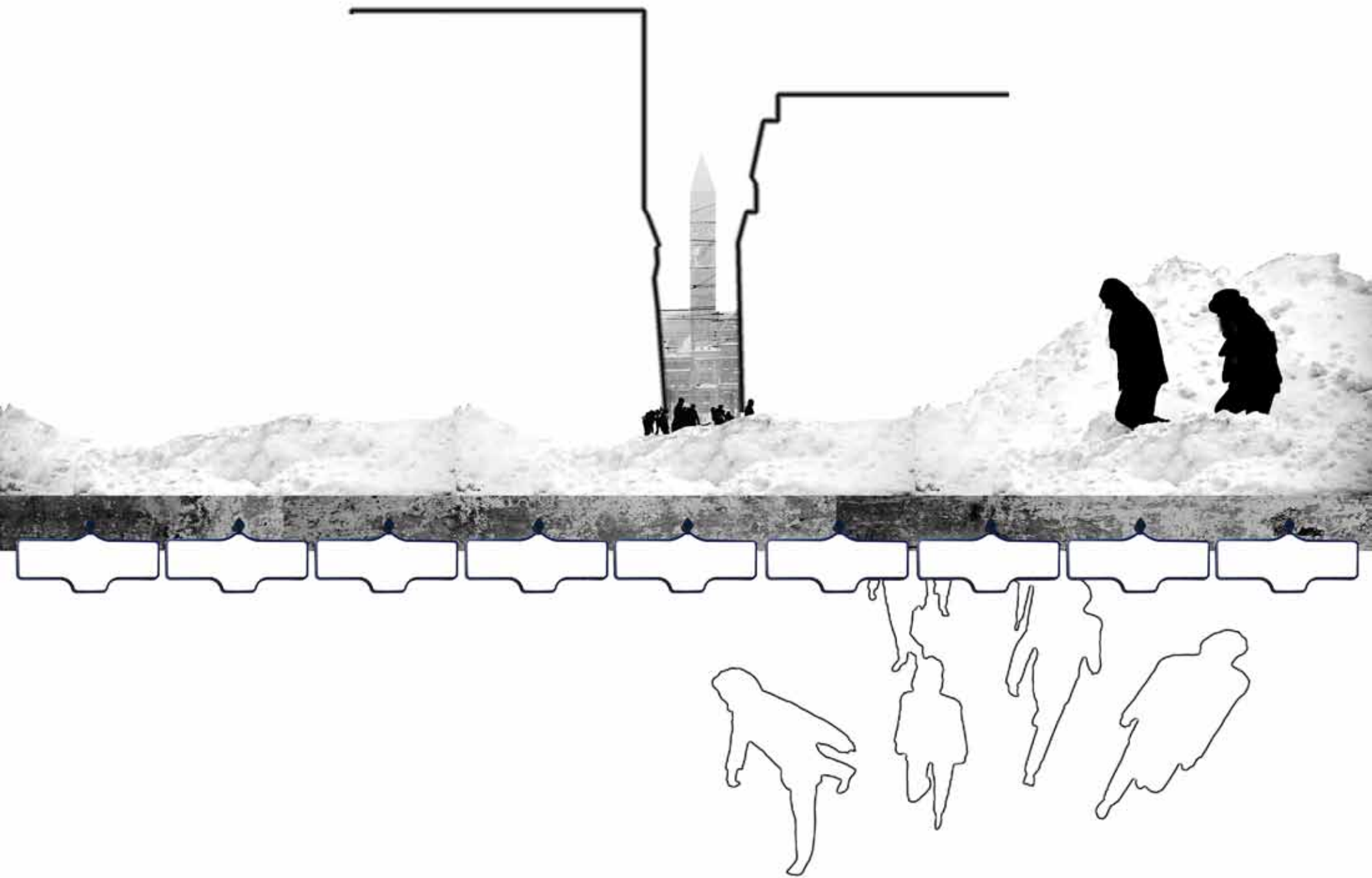
I explain that for my thesis I intend to make this place more accessible to the general public. Gavin is disappointed. He has found a sanctuary in the city where he could be alone.

We proceed and he finds himself shoe-shopping at The Bay.

The Moral of the Story

Quiet places are not bad places: on the weekends, the PATH is a quiet respite from the Eaton Centre and the busy public streets of downtown Toronto.

Union Station



The Eaton Centre

angela+nika: a winter street

Subject 05a: Angela is female, age 31, a former employee at a retail store in the PATH.

Subject 05b: Nika is female, age 32, from Slovenia, has lived in London, UK for 7 years and is visiting Toronto for 2 weeks. Angela and Nika are a couple.

Sunday, Sept. 21, 2014, start 12:15pm, end 12:40pm, 25 mins

After five minutes of struggling to escape out of Union Station, Angela finds her first interactive map at the Allen Lambert Galleria, the enclosed public space in Brookfield Place. Angela checks every map she can along the way to make sure that she's never lost while Nika is intrigued by this underworld.

"It makes sense for a cold country like Canada to have this," Nika says referring to the climate-controlled space. "I just wonder why there aren't more homeless people taking advantage of it."

From Brookfield Place, Angela opts to go north to Commerce Court and then west to TD Centre. At TD Centre, she checks a mall map. Angela says to Nika, "It's upside down." Wellington Street West is shown to be at the top of the map while King Street West is at the bottom. Nika doesn't understand the significance.

Heading north into First Canadian Place, I remember that Angela used to work at Laura Petite in that building. The store has

since relocated to the TD Centre. First Canadian Place is where Angela is most familiar with and now she is able to navigate to the Eaton Centre from her home base.

Angela takes us west and then north into the Richmond-Adelaide Centre. There is a new and interesting coffee shop in the Sheraton Centre. Nika grabs an espresso before we proceed.

I ask Nika what she thinks of the PATH. She explains that she doesn't understand why it's so underused. In terms of navigation, it was easier for her to grasp the areas that were labeled with street names rather than building names.

We are fast-approaching The Bay store and then the Eaton Centre, another place that Angela worked at before. Suddenly, we are engulfed by the shopping crowd in downtown Toronto's busiest mall.

The Moral of the Story

Canadians love the great outdoors but the great outdoors do not love us: for much of the year, walking outside is less than comfortable, especially within the microclimate of the Financial District. The PATH is a useful space for those who work downtown, but it needs to be more user-friendly to welcome visitors.

Union Station

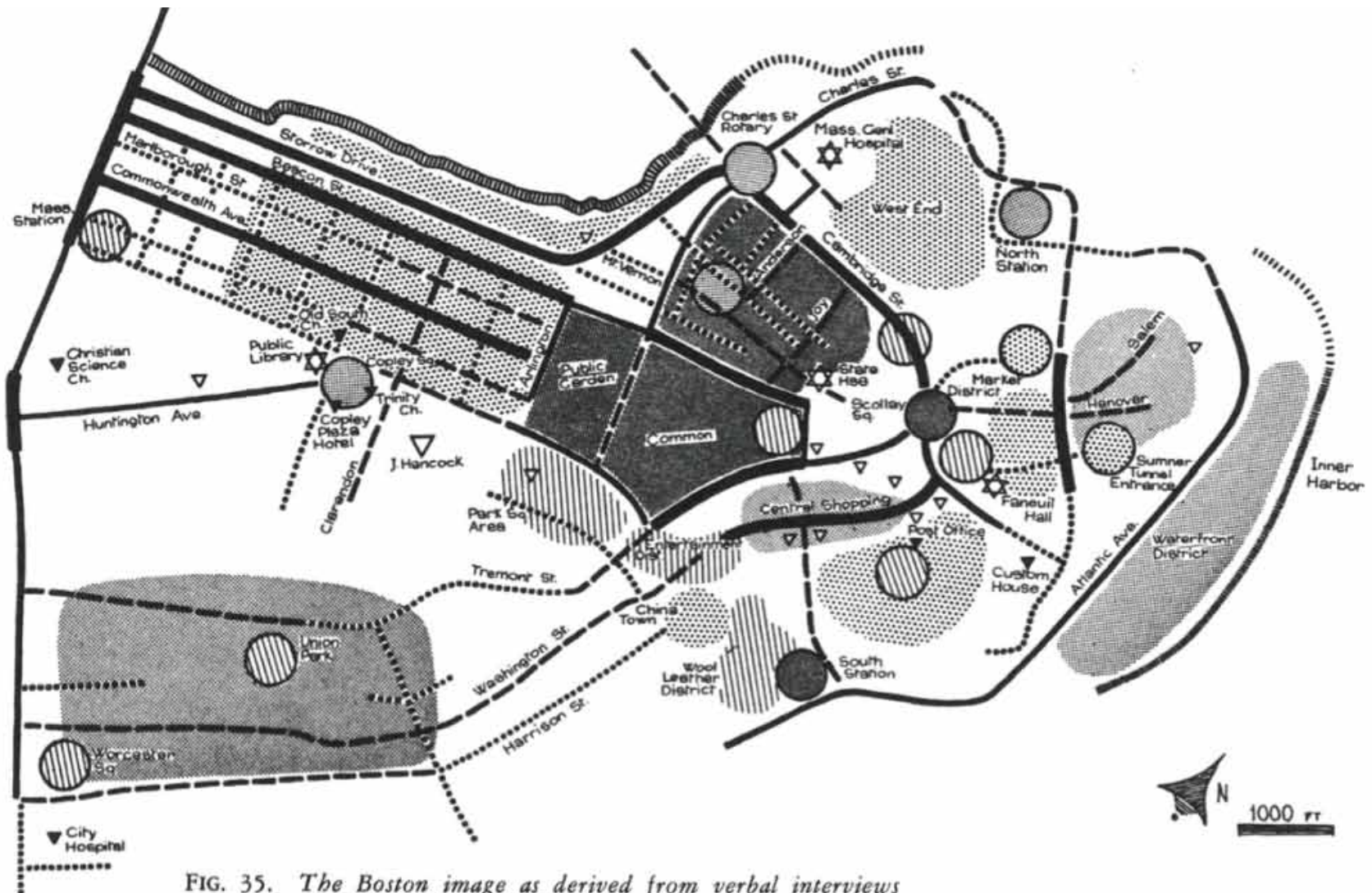


FIG. 35. *The Boston image as derived from verbal interviews*

PATH: cognitive maps

Experiment #2: cognitive mapping of the PATH

Purpose

Following the model of Kevin Lynch,² the purpose of this experiment is to understand how people would visually represent the PATH to instruct others on the route from Union Station to the Eaton Centre by having them produce a cognitive map from memory after finding their own way. The interest is to see what is remembered as a node in this monotonous setting.

Background Research

Cognitive mapping is a term coined by Edward Tolman in 1948 to describe the idea that spatial information is recorded and recalled in the brain as vectors between locations or landmarks.³ Human spatial behaviour is dependent on the individual's cognitive map of the spatial environment.⁴

Hypothesis

Users will blindly navigate the PATH and extract memorable nodes to draw simple but informative diagrams on how to get from Union Station to the Eaton Centre.

Experiment

Five subjects were observed using the PATH to travel from the main hall on the ground level of Union Station to the Eaton Centre. Similar to the previous experiment, the subjects had a varying range of experience with the PATH from first time users to users with nearly ten years experience. The subjects were allowed to use maps and signage within the PATH to guide their way. They were also allowed to ask strangers for direction. I followed and observed their process.

During the walk, subjects would impart their past experience

with the system if they had any. After the walk, subjects were asked to draw a map that would communicate to another person the route from Union Station to the Eaton Centre.

Data + Analysis

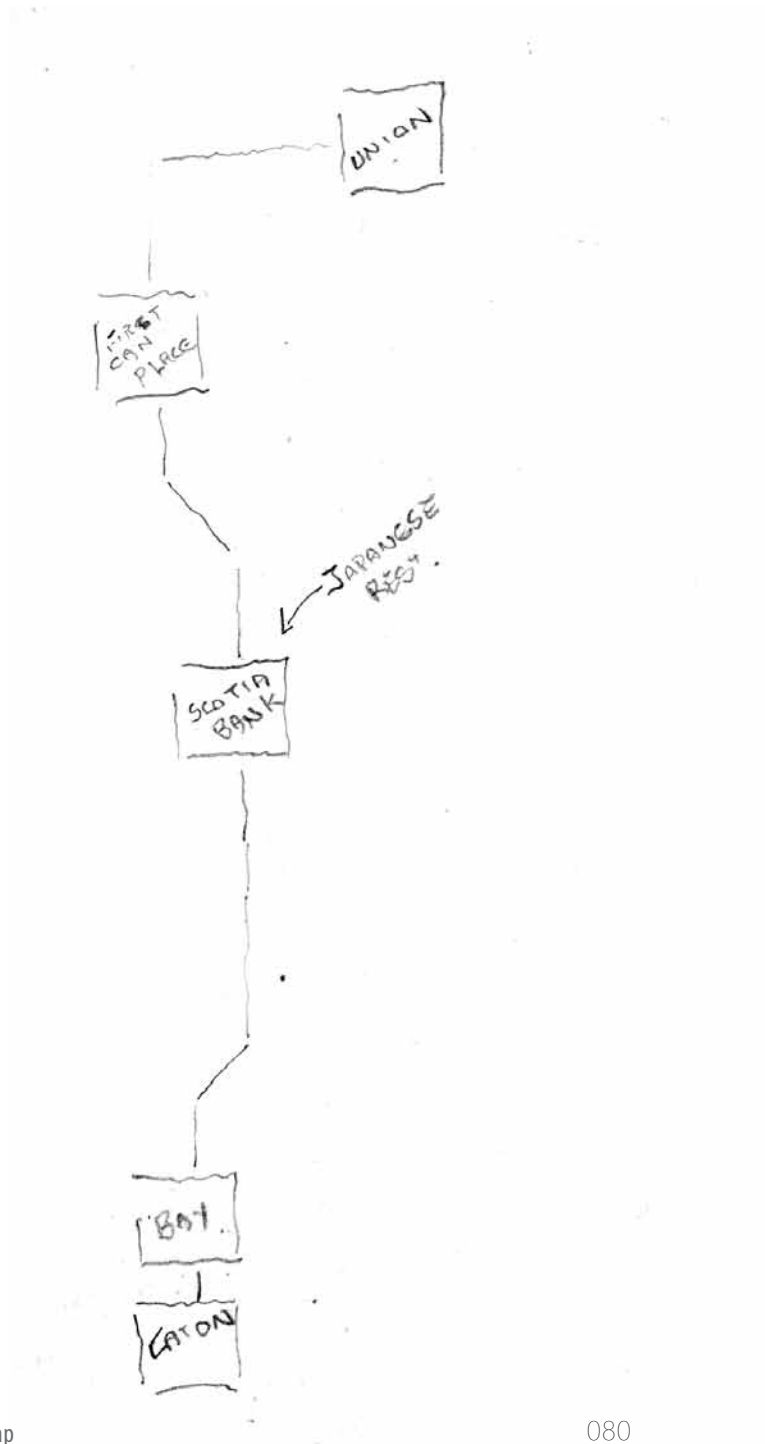
The start and end times of the walk were recorded and compared to the street level walk time of 13 minutes according to Google Map walking directions. Based on observations of and conversations with the subjects, a narrative of the experience was written along with the cognitive map drawn by the subject at the end of the walk and a line delineating the route taken.

Conclusions

An overall anxiety was observed with every subject regardless of the amount of experience they had with the PATH. For example, subject 06 had nine years of experience working in a restaurant in the PATH, yet was not familiar with how to reach the Eaton Centre from Union Station because he had only memorized the route from the restaurant at Brookfield Place. Hence, starting from Union Station contributed to much confusion.

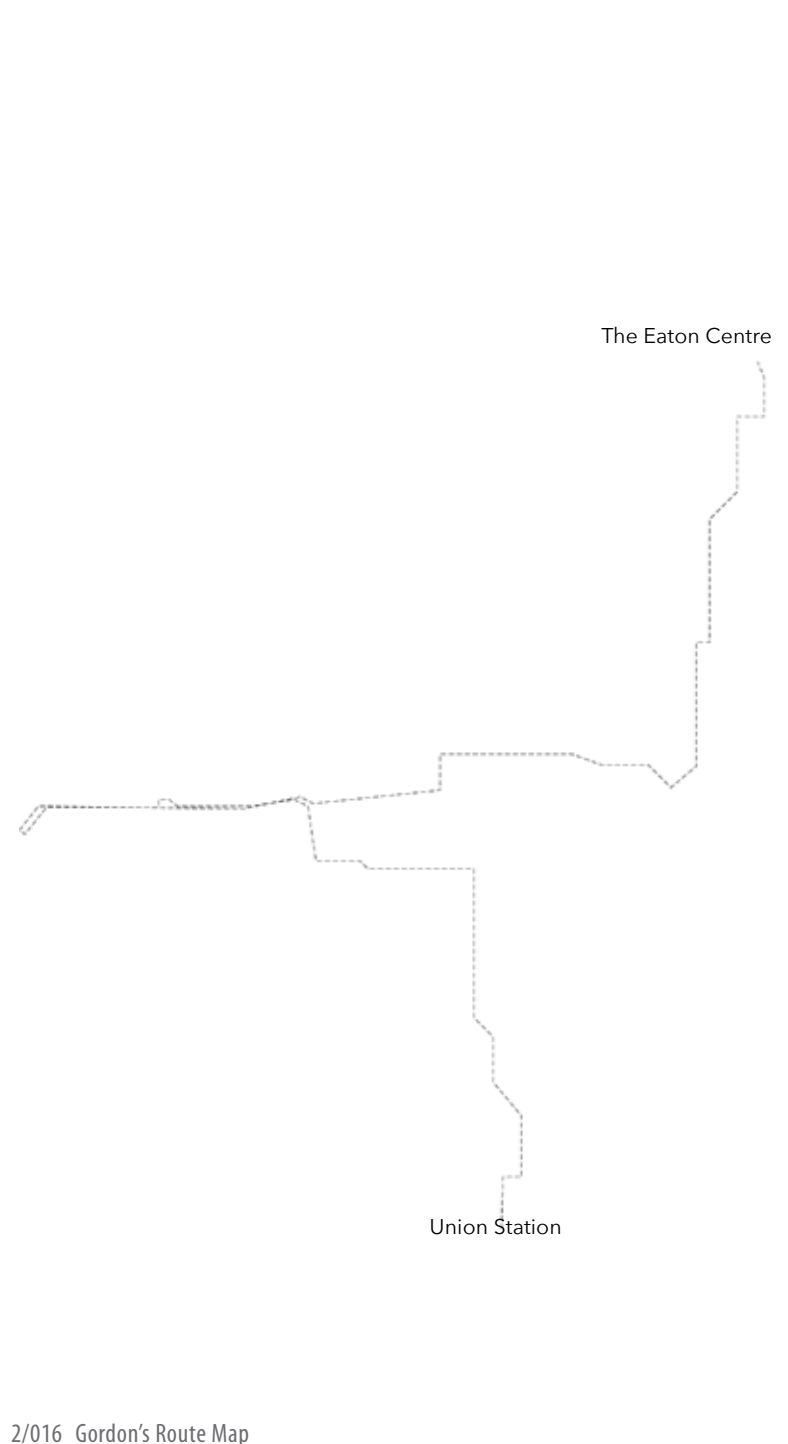
All subjects opted to use pencil in drawing the cognitive map. The drawings were less confident than anticipated. The maps of subject 06 and 09 were both very timid even though subject 09 is a great illustrator when it comes to other types of drawings.

As discussed in experiment #1, there were two preferred routes. The first one through Brookfield Place was considered to be the more direct route after the opening of the Bay-Adelaide Centre. However, on this particular weekend, the tunnel from Union Station to Brookfield Place is obscured by construction, which resulted in all the subjects choosing to go through the Royal Bank Plaza at the start of the experiment.



2/015 Gordon's Cognitive Map

080



2/016 Gordon's Route Map

gordon: one landmark

Subject 06: Gordon is male, age 32, a former employee at a restaurant in the PATH. was no hope of him finding that Japanese restaurant.

Friday, January 16, 2015, start 6:12pm, end 6:45pm, 33 mins

Gordon and I meet in the main hall of Union Station amidst an art exhibition on for that weekend. He is unsure of how long the experiment would take and after consulting me, decides to add money to the parking metre. I follow him to his car and on the way back, he shows me a side entrance to Brookfield Place where him and his restaurant colleagues would take their smoke breaks.

We make our way to the main hall at Union Station from Brookfield Place, all the while, I think that he's going to have such an easy time with the experiment. All he needs to do is retrace the route from Union to Brookfield and head straight north. Instead, he is in total confusion and gets stuck at Union Station for a full two minutes before heading out through Royal Bank Plaza. He is not familiar with this route. The PATH looks entirely different to him from this perspective.

"I remember that there's a Japanese restaurant somewhere along the way to the Eaton Centre," he says, referring to the Japanese restaurant in Scotia Plaza.

We enter TD Centre from the Royal Bank Plaza. Signage within each building only directs you to the adjacent building. Since TD Centre is not directly connected to Scotia Plaza, there

Gordon takes a wrong turn and ends up in the Sun Life Centre. He knows he is lost but is too shy to ask a stranger for directions. He looks to me, I offer no help. In a frantic state, he walks by a map without seeing it. He heads nearly all the way to Roy Thomson Hall before reasoning that St Andrew Station is much farther west of where he wants to be. He turns around.

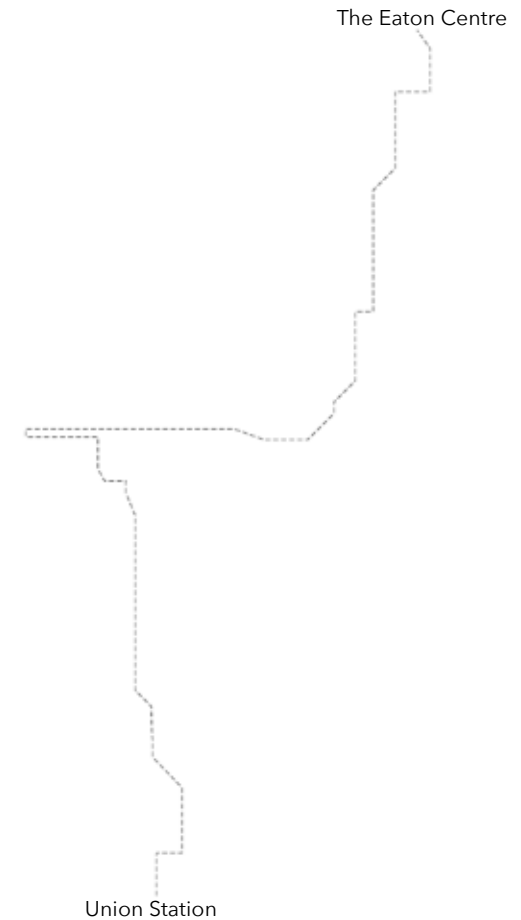
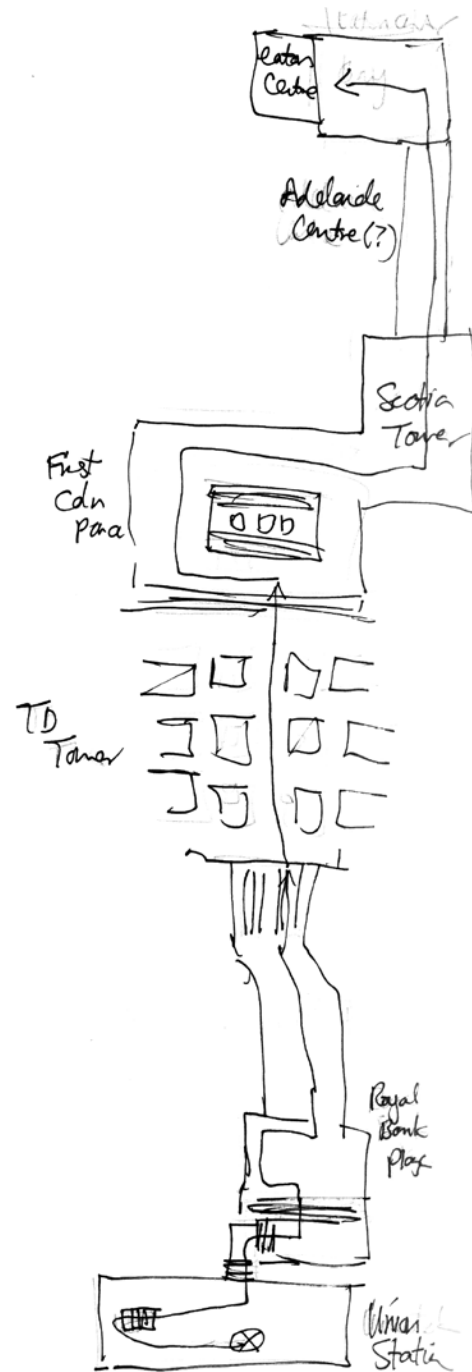
He mumbles about the Japanese restaurant in his frustration of not being able to find it. He walks east to First Canadian Place where he is able to find signage directing him to Scotia Plaza. As soon as he enters the dimly lit interior of Scotia Plaza, he feels the safety of home.

"See, the Japanese restaurant," he points to the restaurant that is in the lobby of the concourse level of Scotia Plaza.

From there, he races his way up north through the Bay Adelaide Centre and the Hudson's Bay Company to the Eaton Centre.

Summary

When asked to draw a diagrammatic map, showing a stranger how to get from Union Station to the Eaton Centre, he draws a timid, upside down map with only one landmark in mind: the Japanese restaurant.



vivien: character of spaces

Subject 07: Vivien is female, age 38, a former employee at an office building connected to the PATH.

Friday, January 16, 2015, start 8:17pm, end 8:35pm, 18 mins

Vivien and I meet in the main hall of Union Station and we walk around the art exhibition before starting the experiment. Having worked an office job in the Financial District some years ago, Vivien is confident that the walk would not take long. She is studying architecture at the University of Toronto and aims to draw a map resembling a floor plan.

As we begin, she is distressed by the chaos of the construction underneath Union Station. She is lost and in a panic regarding how to exit the station without entering the subway. After three minutes, she finds a way out through Royal Bank Plaza.

She enters TD Centre, the next and only logical connection at this point in the PATH.

"I'm not sure if I'm taking the most direct route," Vivien doubts her choices. From the TD Centre, it is a straight path down the centre of the building into the tunnel to First Canadian Place.

Frantically, Vivien tries to find a PATH map at this junction. There is only a mall map with no indication of where the Eaton Centre is. She heads west for a while and decides to go east. Her confidence has evaporated as she repeats that she may not have chosen the most direct route.

We walk through Scotia Plaza and reach the Bay-Adelaide Centre. From there it is a straight passage to The Bay store and the Eaton Centre.

Summary

Vivien's cognitive map resembles one that is drawn of a street in one of Kevin Lynch's experiments. She records her initial confusion at Union Station with vague spaces and a sense of bewildered directionality. In the Royal Bank Plaza, no character is recalled, just a slight veer to the left before reaching the escalators at the tunnel toward the TD Centre.

At the TD Centre, a series of boxes represent the architectural language of the Mies van der Rohe building. In Vivien's drawing, she shows the elevator lobby of the First Canadian Place as an impediment to the straight route. She records walking around the elevator lobby the wrong way before ultimately making a turn to the right toward Scotia Plaza.

The Bay Adelaide Centre is drawn like a tunnel because most of this building's concourse level is still under construction and has no distinguishing features. Once inside the Hudson's Bay Company, the merchandise disorients her. Vivien falsely marks a left turn into the Eaton Centre when in fact, it was a jagged route north.

11) PASS THEN THE DOORS NEXT TO STARBUCKS AND YOU WILL ARRIVE AT THE TORONTO EATON CENTRE.

12) WHEN AT THE BAY, KEEP WALKING STRAIGHT UNTIL YOU SEE THE CAFE AND MAKE A RIGHT TURN UNTIL YOU FIND STARBUCKS TO YOUR LEFT.

13) NEXT TO SHOPPERS, GO THRU THE CORRIDOR WITH THE ESCALATOR TO HOBSON'S BAY.

14) ONCE AT ADELAIDE CENTRE, MAKE RIGHT TURN TO FIND VONN HALL WAY TO SHOPPERS BROW MARET

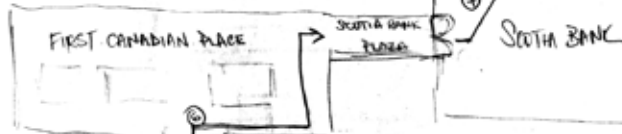
15) ONCE AT FIRST CANADIAN PLACE (WHITE MARBLE BUILDING) MAKE A RIGHT TURN TOWARDS END OF HALL, THEN A LEFT TURN TO FIND & FOLLOW SCOTIA BANK PLAZA SIGN



HOBSON'S BAY



ONCE AT SCOTIA BANK (RED BUILDING) 16) FOLLOW SIGN TOWARDS ADELAIDE CENTRE.



TORONTO DOMINION

17) KEEP GOING STRAIGHT TOWARDS FIRST CANADIAN PLACE PASS THEN ALL THE SHOPS. *RESIST URGE TO SHOP!

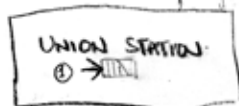


18) MAKE A SHARP LEFT TURN TOWARDS TORONTO DOMINION. *DO NOT TAKE ESCALATORS DOWN

19) GO THRU THE DOORS TO ROYAL BANK PLAZA *MAP AVAILABLE

20) TAKE STAIRS DOWN TO LOWER LEVEL

21) FIND & FOLLOW PATH SIGN (MAKING LEFT TURN)



The Eaton Centre

Union Station

diana: detailed instructions

Subject 08: Diana is female, age 32, a former employee at an office building connected to the PATH. She is from Brazil but has lived in Toronto for many years.

Saturday, Jan. 17, 2015, start 12:31pm, end 12:48pm, 17 mins

After spending an hour intricately putting makeup on her face, Diana and I take the subway to Union Station. She explains that she has an excellent sense of direction except when it comes to the PATH. When she worked in an office building connected to the PATH for a summer internship, she would get lost at every lunch hour, not being able to find the same shop twice or a specific lunch place.

As we enter the Royal Bank Plaza, she looks at the PATH map found on the far right side of the main corridor and memorizes the order of the buildings she needs to pass to get to the Eaton Centre. According to the PATH map, the next building is the TD Centre, but the signage within the Royal Bank Plaza does not clearly point to the TD Centre. Diana asks a security guard for directions on how to get to First Canadian Place.

One level down is the food court of the Royal Bank Plaza. A group of people followed the escalator down to the food court, thinking that the PATH must be on the lower level. That same group ends up rejoining us at the tunnel to the TD Centre as they

take the escalator up from the food court level.

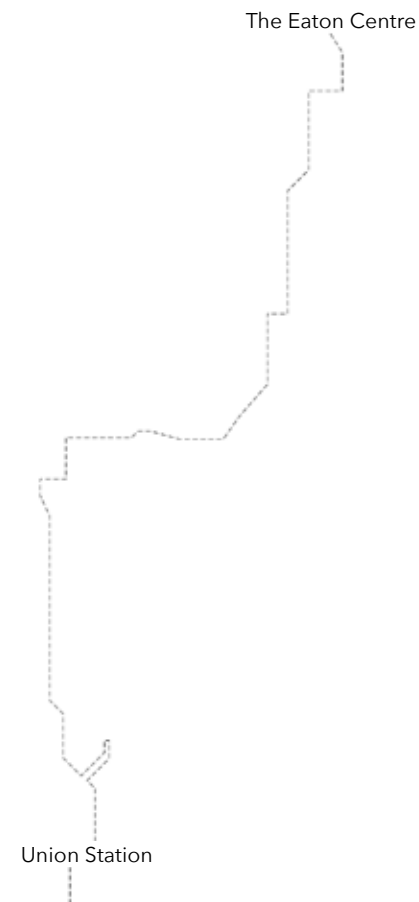
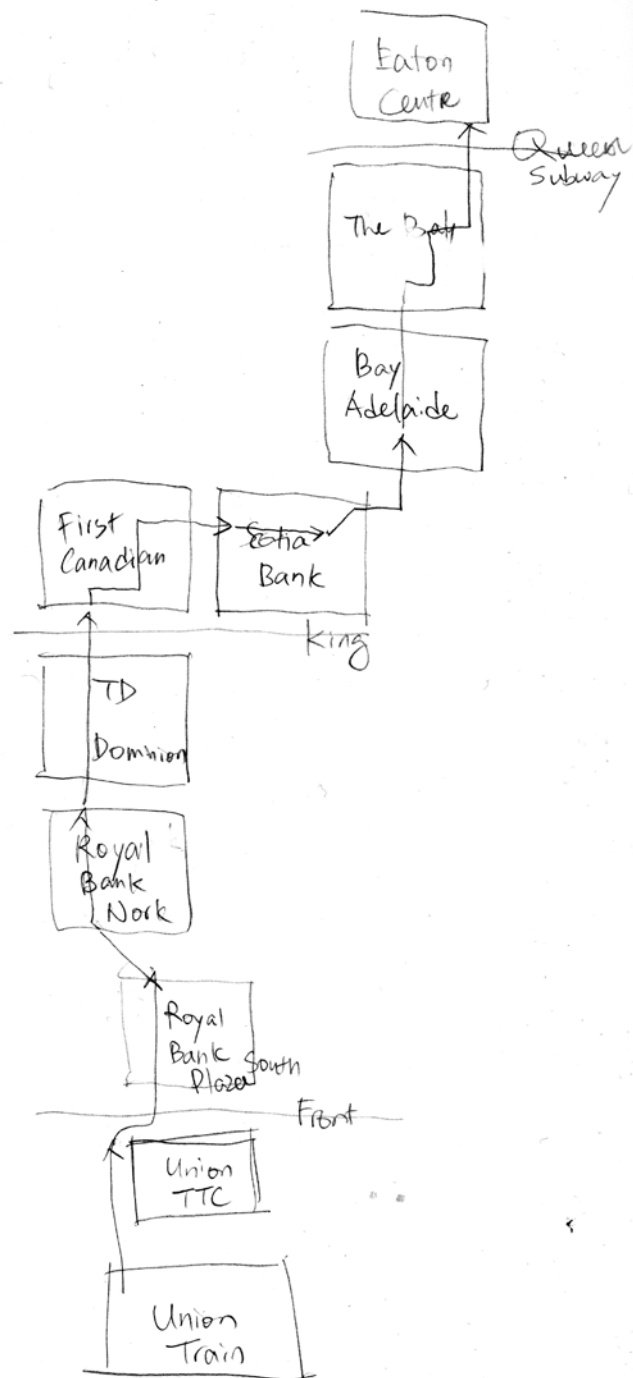
Diana is observant of everything around her. She gets to First Canadian Place expecting to find a PATH map to confirm that she should go to her right next. Instead, she sees only a mall map. She looks confused and a stranger offers to help. She refuses and heads right toward Scotia Plaza.

As she enters Scotia Plaza, she begins to doubt that the route she chose is the most direct route. At the Bay Adelaide Centre, she checks the map and goes to the Hudson's Bay Company, finds the tunnel to the Eaton Centre and the mission is accomplished.

Summary

Diana spent nearly an hour intricately formulating a cognitive map with accurate details of the spaces she passed on her journey from Union Station to the Eaton Centre. She notes the pitfalls of the route, including the detour at the Royal Bank Plaza down into the food court and the retail shops at the TD Centre, which could prove to be a distraction.

Some features Diana noted in her map include: the white marble lobby at First Canadian Place, the large Shoppers Drug Mart at the entrance of the tunnel from the Bay Adelaide Centre to The Bay store, and the Starbucks at the entrance of the tunnel from The Bay store to the Eaton Centre.



susan: frequent map checks

Subject 09: Susan is female, age 34. She is from Taiwan but has lived in Toronto for many years.

Saturday, Jan. 17, 2015, start 4:28pm, end 4:46pm, 18 mins

Susan and I meet in the main hall of Union Station. She is anxious as she descends into the confusing concourse level but remains confident that she will find a map to guide her. While searching for a map, she sees a PATH sign directing her to the Royal Bank Plaza.

Once inside the Royal Bank Plaza, she finds a PATH map on the far right. The PATH map is diagrammatic and although Susan notes the order of the buildings she is to encounter, she has trouble exiting the building that she is in. She tries the north tower route but only reaches a dead end where an elevator to the parking garage is found. As she backtracks, there is a clear sign directing her to the TD Centre.

Inside the TD Centre, she checks a map and heads straight north to First Canadian Place. Before exiting the tunnel from the TD Centre to First Canadian Place, she checks the PATH map on the left side of the tunnel. This map is angled sideways in hopes to coordinate the north end of the map with the cardinal direction of the tunnel. As these angled maps only occur at

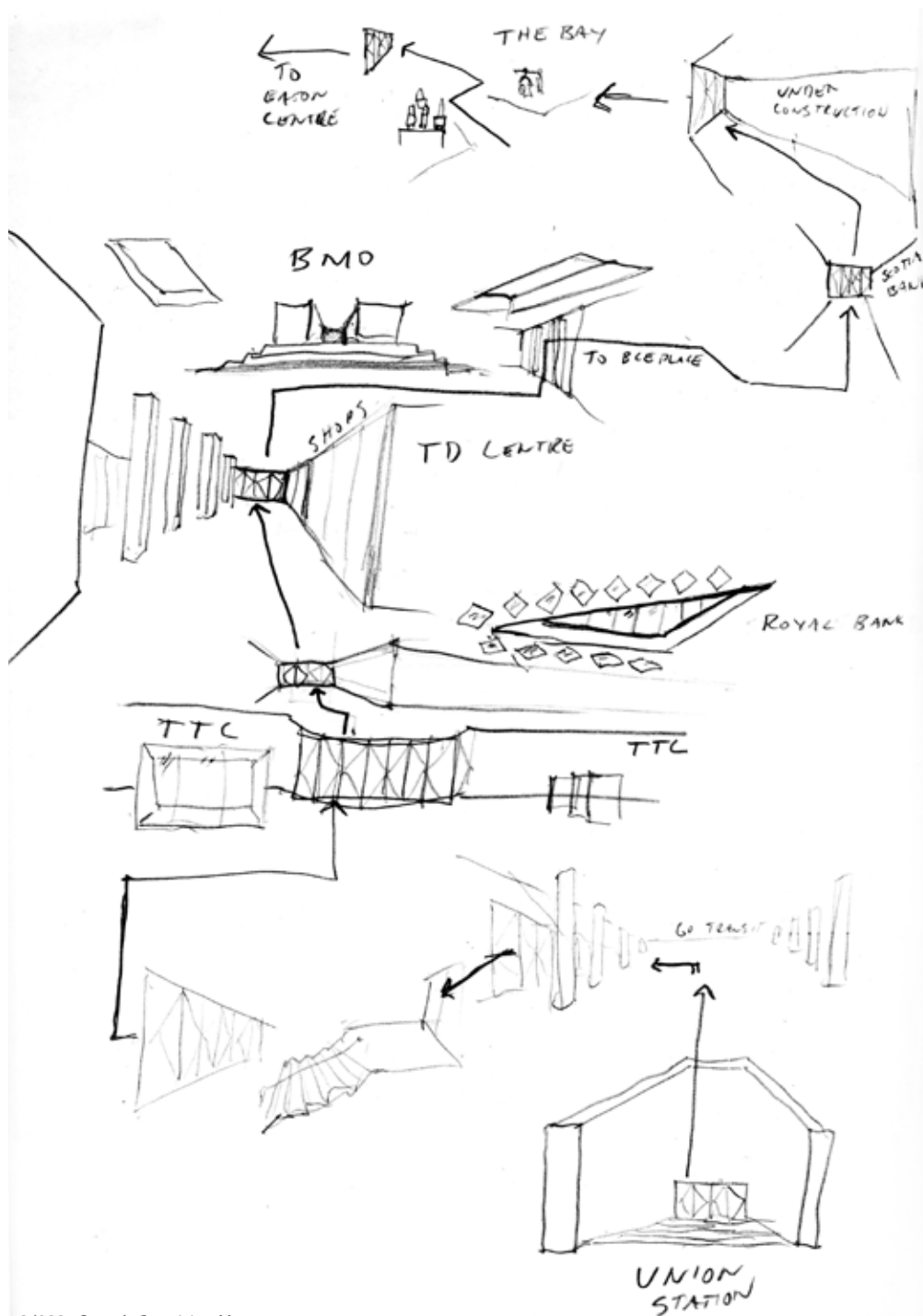
random spots in the PATH, they are of no help in aiding the overall spatial orientation of people using the PATH. Instead, most users question why this one map is angled.

She enters Scotia Plaza following a crowd of people who are most likely heading for the Eaton Centre. As we all enter the tunnel connecting Scotia Plaza to the Bay Adelaide Centre, confusion strikes the crowd. Susan persists with the tunnel and when we reach the Bay Adelaide Centre, she checks the map at the top of the ramp and confirms that she is going in the right direction.

The rest is easy, through the Hudson's Bay Company and into the Eaton Centre.

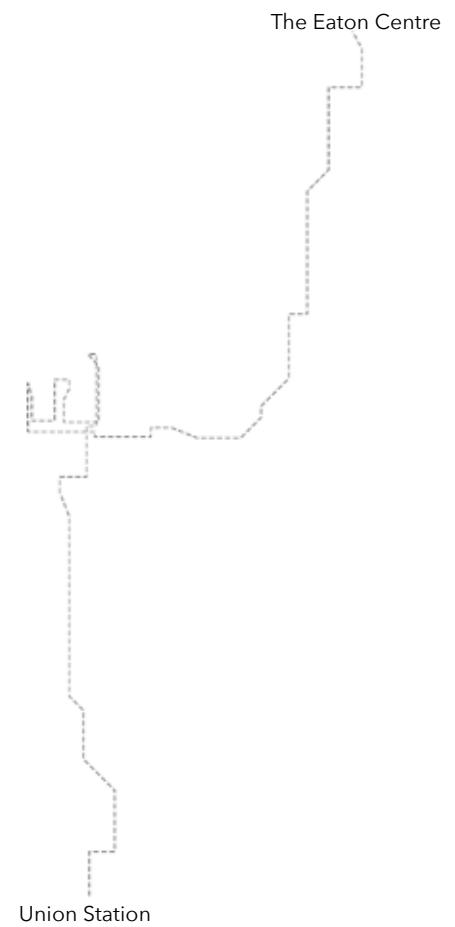
Summary

Because Susan is a practicing architect, I expected her cognitive map to include more architectural features. But her frequent map checks may have contributed to her own map resembling the diagrammatic PATH map. She even replicated the faint lines of the PATH map's indication of the aboveground streets. The only clarification her map includes is the difference between the two parts of Union Station and the two parts of the Royal Bank Plaza.



2/023 Steve's Cognitive Map

088



2/024 Steve's Route Map

steve: no maps

Subject 10: First-time user Steve is male, age 35. He is from Kitchener and has lived many years in London, UK.

Wednesday, Feb. 11, 2015, start 8:08pm, end 8:21pm, 13 mins

Steve and I walk to Union Station from where he parked his car. He is unclear about the experiment, so I explain that he must find his way from Union Station to the Eaton Centre and then draw a map of what he remembers in order to communicate the route to another person.

We begin at Union Station where Steve worked for Via Rail one summer, many years ago. He exits Union Station expertly and proceeds into the Royal Bank Plaza. When presented with escalators going up to the TD Centre at the tunnel between the Royal Bank Plaza and the TD Centre, he is confused.

"I don't think we should be going up," he says. He backtracks a bit but resolves to keep going toward the TD Centre, as there seems to be no other way. Once inside the TD Centre, Steve follows his understanding of the city grid going straight up north from Wellington Street West to King Street West. As he enters First Canadian Place, he clings to the same logic and continues north, veering away from the main corridor of the PATH where all the PATH signage points east and west.

After going down three desolate corridors away from the main pedestrian traffic of the PATH, Steve struggles to figure

out the aboveground streets without consulting any maps. He peaks through windows visible from the concourse level, finally resorting to the First Canadian Place mall map. It is of no help except to indicate that there was no northbound route out of this building.

"You know, I'm not from Toronto," he offers as an explanation.

"Almost none of my subjects are," I say.

Finally taking an eastbound route out of First Canadian Place, he heads north through Scotia Plaza, the Bay Adelaide Centre, the Hudson's Bay Company and through to the Eaton Centre.

Summary

Steve refused to use the maps and signage available in the PATH system, reasoning that his sense of direction and his knowledge of the city grid aboveground would be enough to guide him in the PATH. He spent most of his energy memorizing the architectural features of each building in order to create his cognitive map.

A recurring feature in his map is the series of doors that must be passed through in order to traverse the PATH. He noted areas where light could be glimpsed from openings to the level above. At the very end of the route, he noted the luggage department in The Bay store, which would lead you to the Eaton Centre. The luggage department is a well-known landmark in PATH system that may disappear with the Saks Fifth Avenue renovations.



LAB·Y·RINTH
/'lab(ə),rinTH/

noun

1. A complicated irregular network of passages or paths in which it is difficult to find one's way.
2. An intricate and confusing arrangement.

synonyms

maze - confusion

2/025 Labyrinth Definition

090



STREET
strēt/

noun

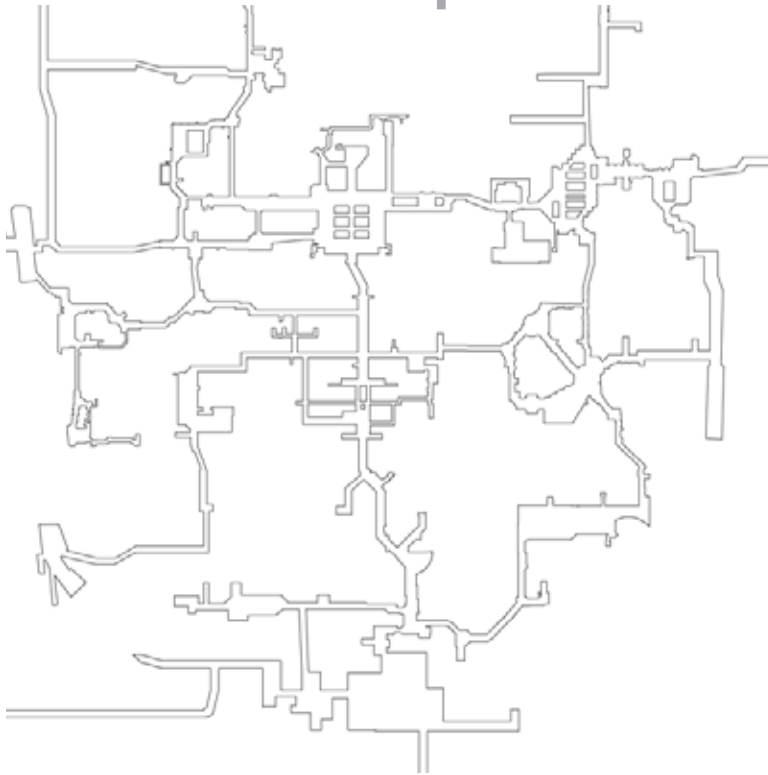
1. A public road in a city or town, typically with houses and buildings on one or both sides.

synonyms

road - thoroughfare - avenue - drive - crescent - boulevard

2/026 Street Definition

PATH: spatial orientation



PATH
/paTH/

noun

1. A way or track laid down for walking or made by continual treading.
2. Such a way or track designed for a particular purpose

synonyms

road – route

"People ask me about the winters in Toronto.... I have no idea. I never go outside. We moved from Vancouver and we found this condo right downtown. It's connected to this thing they call 'the PATH,' probably better labelled 'LABYRINTH.' For the first few months, I just wandered around underground like a gopher. Once in a while I find a subway exit...."

– Irwin Barker, comedian



2/028 Busker in a Corridor of the PATH



2/029 City Garbage Can inside The Hudson's Bay Company just outside of the Queen Subway Station



2/030 City Police on Patrol at the Eaton Centre

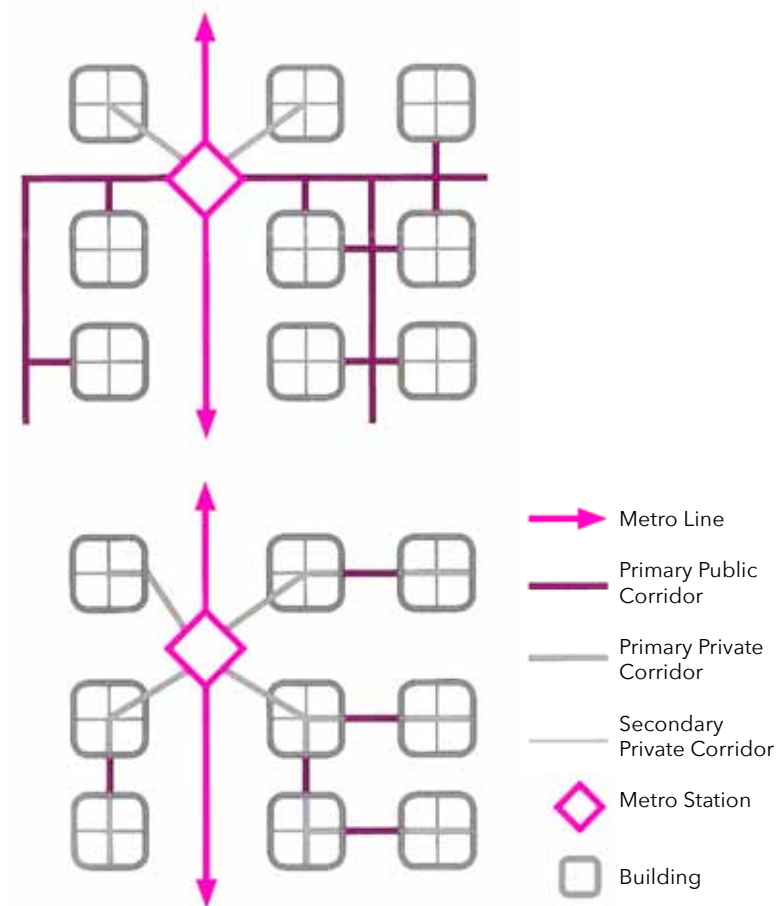
the street versus the PATH

The argument that this is private property, and that the malls are not therefore "city streets" is really not relevant. No visitor knows this and few Torontonians know it either. If they do know, they don't care. All they do know is that it is invariably a frustrating experience and they don't understand "why no one has done something about it."

– Frank Arthur, *Toronto's Underground City* 1986

The PATH is ambiguous in its position as an urban infrastructure. Private ownership prevents it from qualifying as a street even though it poses as a climate-controlled alternative to the aboveground sidewalks. Ownership by multiple factions produces an array of maps and signage for each building that dominates the prime visual real estate but do not coordinate with the system. PATH brand maps and signage are relegated to obscure corners.

The obstacle of private ownership of the subterranean domain is a common problem in North America. Diagram 2/031 compares the Japanese model of transit stations with the North American system. In Japan, transit stations offer exits to public underground corridors⁵ as well as direct exits into private concourses. In Toronto, the subway stations only offer underground exits directly into private buildings. With no network of public corridors, the only parts that could be eligible to be considered as public space are the tunnels that are located under the streets.



2/031 Public/Private Models of Underground Exits from Transit Stations

4.2 List of owners and their properties

Owners	Properties	Owners	Properties
Bell Canada	Bell Trinity Square	Olympia & York Developments Limited	First Canadian Place
Cadillac Fairview Corporation Limited T Eaton Realty Company Limited	Eaton Centre	Oxford Development Group Limited	(BCE Place) National Bank Building Continental Bank Building 111 Richmond Street W The Lanes
Cadillac Fairview Corporation Limited	Toronto-Dominion Centre		
Campeau Corporation Limited	(Scotia Plaza)	Oxrap Limited (Oxford) Guardian Insurance Company	Guardian Tower
Canadian Pacific Hotels Limited Marathon Realty Company Limited	Royal York Hotel	Royal Trust Corporation of Canada Trustee Standard Life	Standard Life Centre
City of Toronto	City Hall		
David Dennis Confederation Life Insurance Company Third Generation Realty	Thomson Building	Simpson's Limited Knox Church Trustees Markborough Properties Limited	(Simpson's)
Royal Bank Realty Inc. Globe Realty Management Limited	Royal Bank Plaza	Sun Life Assurance Company of Canada	Sun Life Centre
ITT Industries of Canada Limited City of Toronto Sheraton Centre Hotel	Sheraton Centre	Toronto Terminals Railway Company City of Toronto	Union Station
Lehndorff Property Management Limited Munich Holdings Limited Munich Reinsurance Company	390 Bay Street	Toronto Transit Commission	Dundas station Queen " King " Union " St Andrew "
Marathon Realty Company Limited	University Place	Twigg Holdings Limited Trizec Equities Limited	Atrium on Bay
National Trust Company Abak Estates Limited	(95 Wellington St W)	Uniwell Developments Limited	55 University Avenue
National Trust Company	Commerce Court	Westin Hotel Company Limited	Westin Hotel
National Trust Company Olympia & York Developments Limited	Aetna Canada Centre		

This list comprises individual Owners.

This list totals some 33 locations which are joined by the pedestrian system.

Those under construction are identified in brackets ().

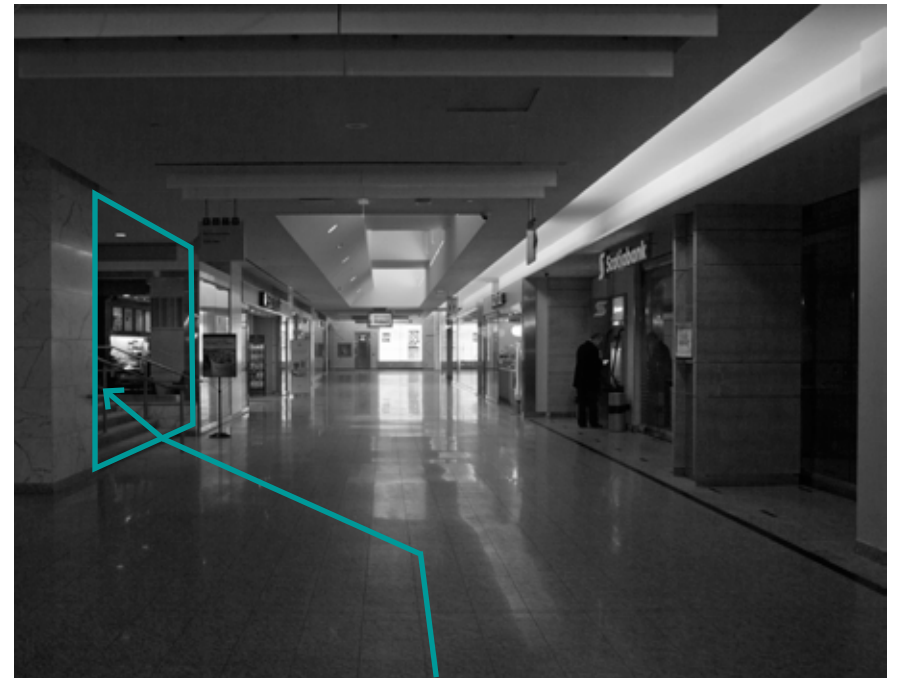
Building	Developer	Typology
A		
Adelaide Place G-12	Dream Office REIT	Office
11 Adelaide West L-12		Office
120 Adelaide West I-12	Oxford Properties	Office
130 Adelaide West H-12	Oxford Properties	Office
Air Canada Centre J-20	-	Attraction
Allen Lambert Galleria L-17	Brookfield Office Properties	Retail
Atrium on Bay L-5	H&R REIT	Retail
Aura M-2	Canderel	Residential
B		
Bank of Nova Scotia K-13	-	Office
Bay Adelaide Centre K-12	Brookfield Office Properties	Office
Bay East Teamway K-19	-	Transportation
10-20 Bay J-22	Oxford Properties	Retail
220 Bay J-16	220 Bay St Management	Office
777 Bay K-1	Canderel	Office
Bay Wellington Tower K-16	Brookfield Office Properties	Office
Bay West Teamway J-19	-	Transportation
Bell Trinity Square K-8	Northam Realty Advisors	Office
Bremner Tower F-20	GWL Realty Advisors	Office
Brookfield Place K-17	Brookfield Office Properties	Office
C		
Cadillac Fairview Tower M-9	Cadillac Fairview	Office
Cambridge Suites Hotel N-10	-	Hotel
CBC Broadcast Centre B-17	-	Attraction
Citibank Place G-19	Oxford Properties	Office
City Hall I-8	-	Attraction
City Hall Parking I-9	-	Transportation
CN Tower B-20	-	Attraction
College Park M-1	Canderel	Residential
College Subway Station M-1	TTC	Transportation
Collins Barrow Place M-15	-	Office
Commerce Court L-15	GWL Realty Advisors	Office
Convention Centre, Metro Toronto B-19	-	Attraction
D		
DBRS Tower (Adelaide Place) F-12	Dream Office REIT	Office
Delta Toronto E-20	-	Hotel
Design Exchange J-16	-	Attraction
10 Dundas East N-5	Bentall Kennedy	Retail
Dundas Subway Station N-5	TTC	Transportation
Dynamic Funds Tower (1 Adelaide East) N-12	Oxford Properties	Office
E		
Eaton Centre M-7	Cadillac Fairview	Retail
Eaton Tower M-7	Cadillac Fairview	Office
Ernst & Young Tower J-16	Cadillac Fairview	Office
Exchange Tower H-13	Brookfield Office Properties	Office
F		
First Canadian Place I-13	Brookfield Office Properties	Office
Four Seasons Centre for the Performing Arts G-10	-	Attraction
22 Front West L-18	Brookfield Office Properties	Office
151 Front West E-19	Allied Properties REIT	Office
255 Front West B-19	Oxford Properties	Office
G		
GO Transit (rail) J-18	GO	Transportation
GO Bus Terminal K-19	GO	Transportation

Building	Developer	Typology
H		
60 Harbour J-21	Oxford Properties	Retail
90 Harbour H-21	Menkes Developments Ltd.	Residential
Harbourfront Streetcar Station J-18	TTC	Transportation
Hilton Toronto F-11	-	Hotel
Hockey Hall of Fame M-18	-	Attraction
Hotel Le Germain Maple Leaf Square H-20	-	Hotel
HSBC Bank of Canada G-16	Brookfield Office Properties	Office
I		
Infinity Condos (25 Lower Simcoe) E-20	Conservatory Group	Residential
InterContinental Toronto Centre Hotel D-19	-	Hotel
K		
1 King West M-15	Harry Stinson	Residential/Hotel
4 King West M-14	GWL Realty Advisors	Office
130 King West H-14	Brookfield Office Properties	Office
145 King West F-14	Bentall Kennedy	Office
200 King West E-14	Bentall Kennedy	Office
225 King West C-14	Oxford Properties	Office
King Subway Station N-14	TTC	Transportation
M		
Maple Leaf Square H-20	Cadillac Fairview	Attraction
MaRS Discovery District F-1, H-1	MaRS Development	Office
MetroCentre B-14	Oxford Properties	Office
Metro Hall B-15	-	Office
Metro Toronto Convention Centre B-19	-	Attraction
MTCC, South Building D-20	-	Attraction
Munich Re Centre (390 Bay Street) J-10	-	Office
N		
Northbridge Place (105 Adelaide West) I-12	Brookfield Office Properties	Office
O		
One Dundas West M-5	Cadillac Fairview	
One Queen Street East N-9	20 VIC Management Inc	
Osgoode Subway Station E-9	TTC	Transportation
P		
Parking, City Hall I-9	-	Transportation
Parking, University Ave. E-15	-	Transportation
Plaza at Sheraton Centre, The H-10	-	Hotel
PwC Tower G-20	GWL Realty Advisors	Office
Q		
2 Queen East N-9	Brookfield Office Properties	Office
Queen Subway Station N-9	TTC	Transportation
Queen's Park Subway Station E-1	TTC	Transportation
88 Queens Quay West H-22	Oxford Properties	Office
R		
RBC Centre D-16	Cadillac Fairview	Office
RBC WaterPark Place H-22	Oxford Properties	Retail
20 Richmond East N-10	20 VIC Management Inc	Office
85 Richmond West I-11	Oxford Properties	Office
111 Richmond West H-11	Oxford Properties	Office
Richmond-Adelaide Centre H-12, I-12	Oxford Properties	Office
Ripley's Aquarium of Canada C-20	-	Attraction
Rogers Centre A-20	-	Attraction
Royal Bank Plaza J-17	Oxford Properties	Office
Royal Bank Building (20 King St. West) L-14	Oxford Properties	Office
Roy Thomson Hall D-15	-	Attraction
Ryerson School of Business K-6	-	School

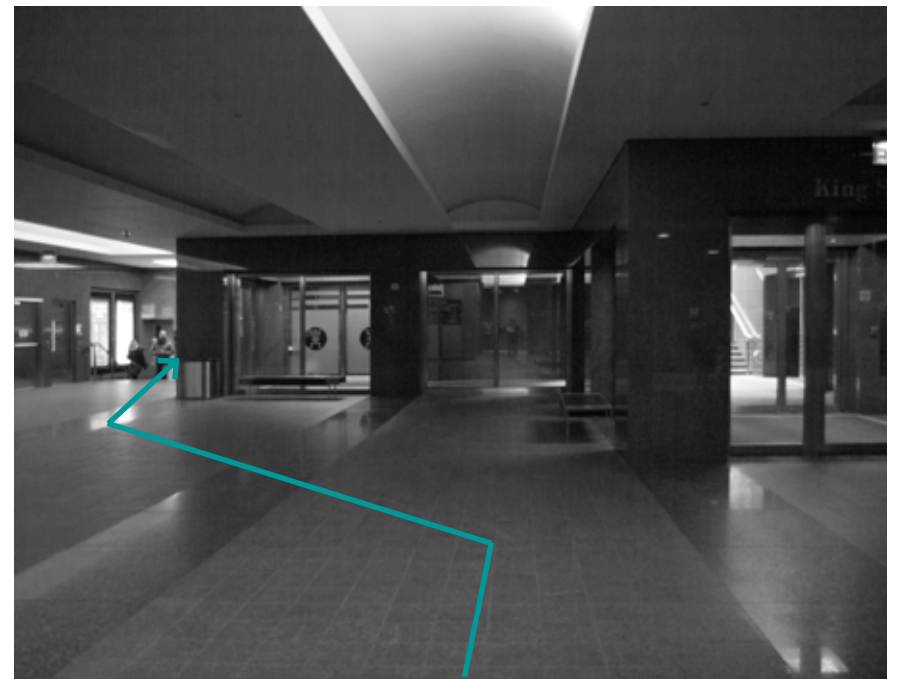
Building	Developer	Typology
S		
Sam Pollock Square M-17	Brookfield Office Properties	Attraction
Scotia Plaza L-13	Dream Office REIT	Office
Sheraton Centre Toronto Hotel H-10	-	Hotel
Simcoe Place D-18	Cadillac Fairview	Office
Simpson Tower K-10	-	Office
SkyWalk E-19, G-19	-	Transportation
Southcore Financial Centre E-20, G-20	Menkes Developments Ltd.	Office
St. Andrew Subway Station E-14	TTC	Transportation
St. Patrick Subway Station E-5	TTC	Transportation
Standard Life Centre H-14	Bentall Kennedy	Office
Sun Life Centre E-13, F-13	-	Office
Sun Life Tower F-14	Menkes Developments Ltd.	Office
T		
TD Canada Trust Tower K-18	Oxford Properties	Office
TD North Tower I-14	Cadillac Fairview	Office
TD South Tower I-16	Cadillac Fairview	Office
TD West Tower (100 Wellington West) H-16	Cadillac Fairview	Office
The Fairmont Royal York Hotel H-18	-	Hotel
The Hudson's Bay Company L-10	-	Retail
The Ritz-Carlton Hotel C-16	-	Hotel
Thomson Building J-10	-	Office
Toronto Coach Terminal J-5	-	Transportation
Toronto-Dominion Bank Pavilion J-14	Cadillac Fairview	Office
Toronto-Dominion Bank Tower I-16	Cadillac Fairview	Office
Toronto-Dominion Centre J-15	Cadillac Fairview	Office
Toronto Marriott Downtown Eaton Centre L-7	-	Hotel
U		
Union Pearson Express (Spring 2015) G-19	-	Transportation
Union Station J-18	-	Transportation
Union Subway Station J-18	TTC	Transportation
55 University F-16	Bentall Kennedy	Office
181 University F-12	-	Office
438 University E-6	-	Office
480 University E-5	-	Office
481 University F-5	Davpart	Office
500 University E-1	-	Office
University Parking E-15	-	Transportation
V		
VIA Rail Canada H-19	-	Transportation
Victory Building (80 Richmond St. West) I-10	Dream Office REIT	Office
W		
WaterPark Place J-22	Oxford Properties	Retail
95 Wellington West H-16	Prudential Developments Ltd	Office
200 Wellington West C-16	Oxford Properties	Office
Y		
Yonge-Dundas Square N-6	-	Attraction
Yonge Richmond Centre N-10	GWL Realty Advisors	Office
100 Yonge M-13	Dream Office REIT	Office
104 Yonge M-13	Dream Office REIT	Office
110 Yonge M-12	CREIT	Office
151 Yonge St	Brookfield Office Properties	Office
444 Yonge M-2	Canderel	Residential
25 York H-19	Menkes Developments Ltd.	Residential
150 York G-12	-	-
York Centre (16 York St.) G-20	Cadillac Fairview	Residential
York East Teamway H-19	-	Transportation
York West Teamway G-19	-	Transportation



2/034 Rare Glimpse to the Exterior - Commerce Court Light Well



2/035 Lack of Obvious Visual Cues - Bay Adelaide Centre



2/036 Disorienting Irregular Angles - Scotia Plaza

a labyrinth versus a path

Unlike the Toronto system (from which users almost never see the outdoors), in Montreal they are frequently treated to “stolen views” of the buildings in the environment which they can orient themselves by. This has been much admired and reduces the need for orientation signage.

– Frank Arthur, *Toronto’s Underground City* 1986

Newspapers and local popular culture often dub the PATH as a labyrinth or a maze, emphasizing the difficulties of traversing this large subterranean space. By definition, a path should be a route designed with the purpose of moving pedestrian traffic efficiently through a place. The PATH does no such thing. As a subterranean space, it is, by default, inferior to outdoor spaces for ease of spatial orientation, which relies on landmarks and natural light as guiding elements. This combined with irregular angled jogs and turns on the main routes makes it easy for a person to get lost.

Spatial orientation in subterranean spaces is already more challenging than in outdoor streets due to the lack of visual cues from directional sunlight and landmarks that rise above the average sightline. Other than the portion that is near the waterfront where bridges are a dominant feature, most of the PATH tends to be restricted to the concourse level of the buildings in the Financial District. The PATH has limited access to natural light. The instances where the street level or the sky could be seen through windows from the concourse level are few.

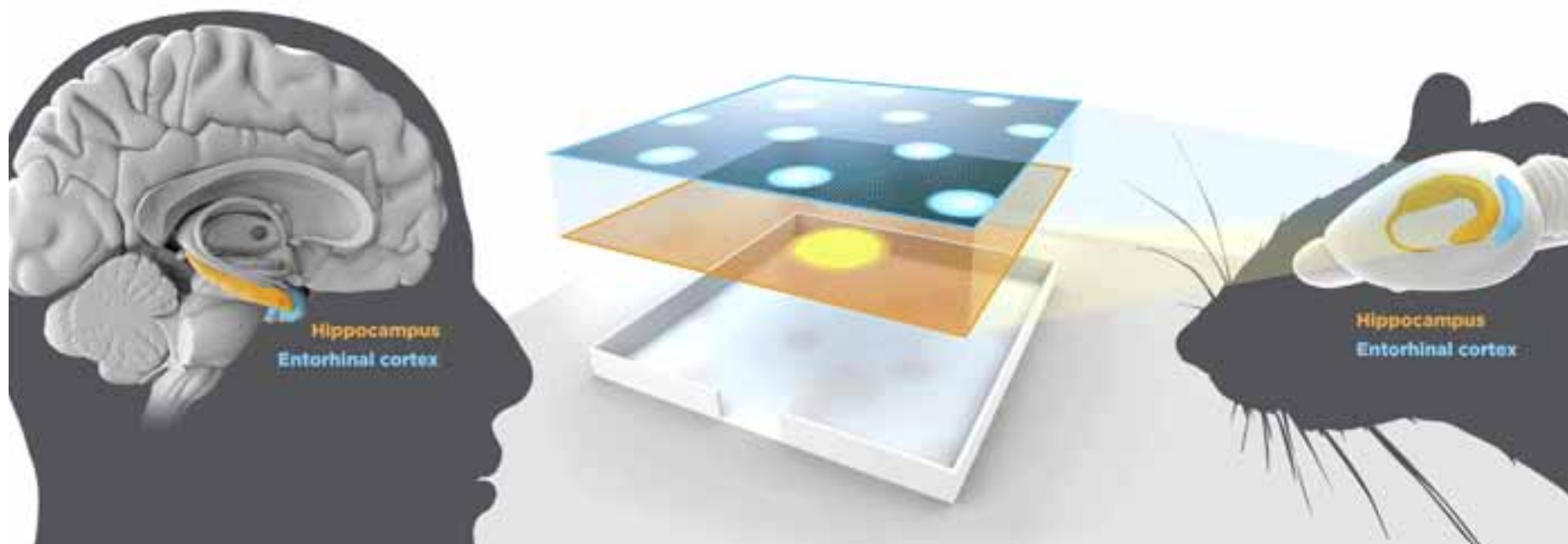
Vertical atrium spaces and horizontal food court spaces stand out as nodes in the PATH. However, they do not occur in every building. The only volumetrically consistent space that recurs in

predictable intervals is the understreet tunnels that connect the buildings.

At present, architectural articulation of the tunnels is dependent on their parent building. Two tunnels attached to the same building could look identical, adding to the problem of disorientation.

Irregular angles and curves in the PATH are an impediment to navigation.⁶ The shape of a pathway plays less of a role in navigation if it is connecting two distinct landmarks.⁷ The PATH is devoid of clear landmarks and therefore the task of remembering a route involves encoding the direction of travel and changes to the direction of travel. Non-orthogonal changes of direction more difficult to remember because the language required to describe them are more ambiguous. For example, instead of saying “turn right then go straight”, instructions like “veer to the left and then take a slight right” are more complex. Studies show that a person is more likely to err when backtracking after facing a detour if the pathway of travel had irregular angles.⁸

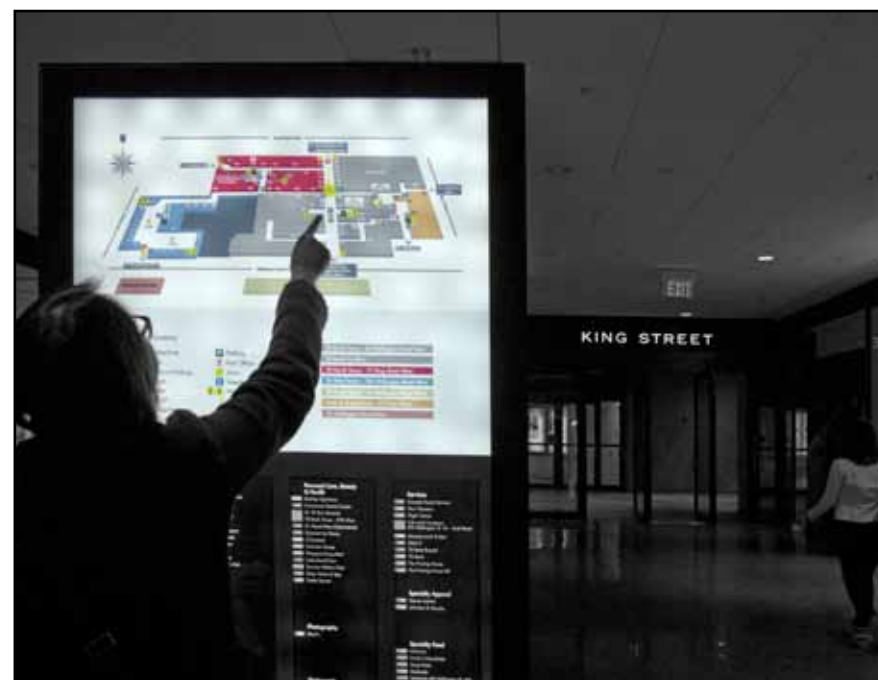
Irregular angles in the PATH are a result of the planning department’s singular focus on the philosophies of Jane Jacobs from the 1960s to the 1980s, causing it to devote all of its attention to street level activity and neglect the shaping of the underground city.⁹ Given that the PATH is comprised of a multitude of distinct architectural styles that descend into the concourse level and that the remnant spaces around the elevator cores are irregular in shape, without they city as an overseer, the locations of the openings to the understreet tunnels are not always in cardinal alignment.



2/037 Diagram of Where Grid Cells (blue) and Place Cells (orange) are stored in the Brain



2/038 PATH Brand Map with North not at the Top - Map at Tunnel Under King St W, west of Bay St
098



2/039 Mall Map in use as PATH Brand Map not found - Map at TD Centre

methods of orientation

Spatial orientation is acquired through two main methods and virtual variations of those methods. The primary method called direct experience involves physically walking through the space and understanding it through sensory and motor perception. The secondary method is indirect experience, which involves seeing the place through symbolic representation i.e. a scaled map. Direct experience in a virtual environment and interactive maps represent advanced iterations of the methods. While both direct experience and indirect experience require practice for any given space to be learned, direct experience is considered the more robust spatial navigation technique, tapping into the place cells and grid cells of the brain.

The PATH is complex and drawing a map or giving verbal instructions is not effective. According to expert user Catherine, her managers took the time to walk her through the space to help her learn the routes for attending client meetings. In the second experiment, Diana annotated her cognitive map with extremely detailed instructions to prevent others from getting lost. The learning curve of direct experience could be shortened if the spaces offered memorable nodes to make popular routes more easily distinguishable.

After the construction of the Adelaide Street tunnel opened up the possibility to traverse the downtown core from Union Station to the Eaton Centre, navigation was the obstacle preventing the underground from being used in this manner. The city became the underground's coordinating agency with the sole purpose of implementing a wayfinding system. Yet, the PATH is not under public jurisdiction, therefore maps and signage could not be mandated as street signs. The size and location of each map and sign were disputed by each building owner.

The existing map and signage system would be effective

if prominently displayed together. The map shows the overall system while the signage alerts the users to buildings that are directly adjacent. One of the fatal flaws to this wayfinding system is that rarely are the maps and signage located in close enough proximity to be used effectively. Users have to memorize the order of buildings that they must pass through from looking at the map and then be able to recall the information as they see the signage. Another downfall of the maps is that they are not always oriented with north at the top. Spatial orientation through the use of symbolic representation is most effective if the representation is always oriented in the same way.¹⁰ Each building also has its own brand of signage that is larger and dominates the prime areas for signage placement.

This chapter investigates solving the problem of navigating the PATH by enhancing the direct experience through sensory-based design at the sites of the understreet tunnels to lessen the reliance on maps and signage. The understreet tunnels represent a sudden spatial compression that is anticipated and endured for the time it takes to traverse the tunnel.

A simple form of navigation is to approach a landmark directly, referred to as cue guidance. In cognitive terms, such processing depends on visual recognition memory or recall and is not dependent on memory for location. Thus, cue-based navigation typically invokes pattern or object perception, with memory of previous encounters guiding the response.¹¹

Devoid of landmarks, artificial nodes could be created if distinct colours, textures, sounds and scents are applied to the tunnels. The redesigned tunnels would serve as navigational memory cues in the PATH.

sensory memory

Colour + Iconic Memory

Iconic memory refers to the visual component of sensory memory that intakes and stores visual information briefly before it is encoded into visual short-term memory. Information in short-term memory may have the opportunity to be transferred into long-term memory, through repetition and/or if more attention focused on it.¹² Colour has been found to aid memory by increasing attention.

A colour-coded lighting system of routes could be applied to the understreet tunnels. Currently, each understreet tunnel's design aesthetic is similar to its parent building, making it part of the overall visual sensory information to be ignored. Studies show that attention can increase memory performance in terms of recall rates¹³ and quick reaction times,¹⁴ therefore systematically colour-coding the tunnels will make them stand out as nodes.

Texture + Implicit Haptic Memory

Haptic memory refers to the tactile component of sensory memory that recollects data acquired by touch after a stimulus has been presented. Implicit memory is the unconscious ability to recall previously presented information. Implicit haptic memory refers to the ability to recall the texture of previously touched stimuli through visual perception.

Tactile cues in the form of perforated patterns on bent metal panels will be selected to differentiate each route. The bent metal panel will also indicate cardinal directions by always being installed on the east wall in north-south tunnels and on the north wall in east-west tunnels.

Sound + Echoic Memory

Echoic memory refers to the auditory component of sensory memory. Unlike visual stimuli, auditory stimuli are not scanned over and over again by the eyes. Instead, auditory stimuli are

received by one ear and then the other before the stimuli could be processed and understood. For example, a person cannot process a sentence until the entire sentence is heard. Therefore, echoic memory stores for almost twice as long as iconic memory before it is encoded into short-term memory.

A meaningful narrative of sound is applied to each route to facilitate navigation through echoic memory.

Smell + Episodic Memory

Episodic memory is the memory of events described with contextual details such as time, place and emotion. Stored in the amygdala with direct and indirect pathways to the olfactory cortex and the hippocampus, these connections are believed to exist because olfactory stimuli often relate to threats in nature. Emotions such as fear are encoded through olfactory memory. This could explain why scents conjure up episodic memories. The hippocampus consolidates memory and spatial navigation.

Smells as sensory cues have been mapped and used in the interior design of buildings. Kate McLean's scent maps capture aromatic patterns of urban centres. Drawn without cartographic elements such as street names, architectural landmarks and geographic features, this ongoing project offsets the favouring of visual and auditory information.¹⁵ Scent designers work with architects and interior designers to introduce scents to interior spaces such as hotel lobbies through their HVAC system to ensure that the smell of a place enhances the experience of it and the emotional response it elicits.¹⁶

All tunnels pertaining to the same route would have the same scent to reinforce the pattern of the route. Figure 2/044 shows ten distinguishable types of scents. Scent selection for the tunnel routes would be based on this chart to ensure that the scent for each route is easily identifiable to the general population.



doi:10.1371/journal.pone.0073289.t001

2/041 Chart of Ten Basic Categories of Smells Detectable by the Nose

PATH sensory routes

Structuring and identifying the environment is a vital ability among all mobile animals. Many kinds of cues are used: the visual sensations of colour, shape, motion, or polarization of light as well as other senses such as smell, sound, touch, kinaesthesia, sense of gravity, and perhaps of electric or magnetic fields... Despite a few remaining puzzles, it now seems unlikely that there is any mystic "instinct" of way-finding. Rather there is a consistent use and organization of definite sensory cues from the external environment. This organization is fundamental to the efficiency and to the very survival of free-moving life.

– Kevin Lynch *Image of the City* 1960

After the photographic analysis of the PATH in Chapter One, the first two of the four areas, namely the Union Station Loop and the parallel alleys of King Street, were selected for the implementation of sensory-based tunnel design because they have long and continuous routes with more tunnels.

These two areas are each subdivided, resulting in four different routes. The Union Station Loop is separated into Union Station Westside Route and Union Station Eastside Route while the parallel alleys of King Street become King Alley North and King Alley South.

Simple colours were selected for each route. Textures and smells commonly associated with those colours were applied to each route.¹² Sounds that matched with the other three components were added to complete the picture.

1. Union Station Eastside Route (E) (blue, hard, woody, running stream)

This route roughly parallels the east side of Bay Street, heading north from Union Station to the Eaton Centre, with one severe jog to the east at Brookfield Place.

Blue is paired with the woody scent of nature. The straight lines of a forest will be the pattern for this route. Sounds of water running through a stream would complete the nature experience.

2. Union Station Westside Route (W) (green, hard, mint, whispers)

This route roughly parallels the west side of Bay Street, heading north from Union Station to City Hall, with one severe jog to the west at First Canadian Place.

Green is paired with the scent of mint. Mint is associated with hard textures, therefore a rigid grid pattern will be superimposed on metal for this route. Background whispers conjure up the image of breath, which is also associated with mint.

3. King Alley North (N) (red, soft, floral, swaying grass)

This route roughly parallels the north side of King Street West. At present, it connects King subway station to St Andrew subway station.

Red is associated with floral scents. Floral scents conjure up the image of soft textures. A texture of petals in the wind could be used in the articulation of the tunnel while the sound of grass swaying in the wind would be audibly detectable.

4. King Alley South (S) (orange, soft, citrus, rustling leaves)

This route roughly parallels the south side of King Street West. At present, it connects King subway station to St Andrew subway station and extends west to Metro Hall.

Orange is associated with citrus aromas. Citrus scents conjure up the image of an orange grove and soft textures. A leafy pattern will be superimposed on metal with sounds of rustling leaves in the background for this route.

--- Union Station Eastside Route

--- Union Station Westside Route

--- King Alley North

--- King Alley South

- 01. 145 King St W
- 02. Bay Adelaide Centre
- 03. Brookfield Place
- 04. The Bay Store
- 05. CBC
- 06. Commerce Court
- 07. The Eaton Centre
- 08. First Canadian Place
- 09. King Station
- 10. Metro Hall
- 11. Richmond-Adelaide Centre
- 12. Royal Bank Place
- 13. Royal Bank Plaza
- 14. St. Andrew Station
- 15. Scotia Plaza
- 16. Simcoe Place
- 17. The Sheraton Centre
- 18. TD Centre
- 19. Union Station

Queen St

Richmond St

Adelaide St

King St

Wellington St

Front St

University Ave

York St

to City Hall

Bay St

Yonge St

06

04

02

15

09

06

03

08

16

13

19

17

11

14

01

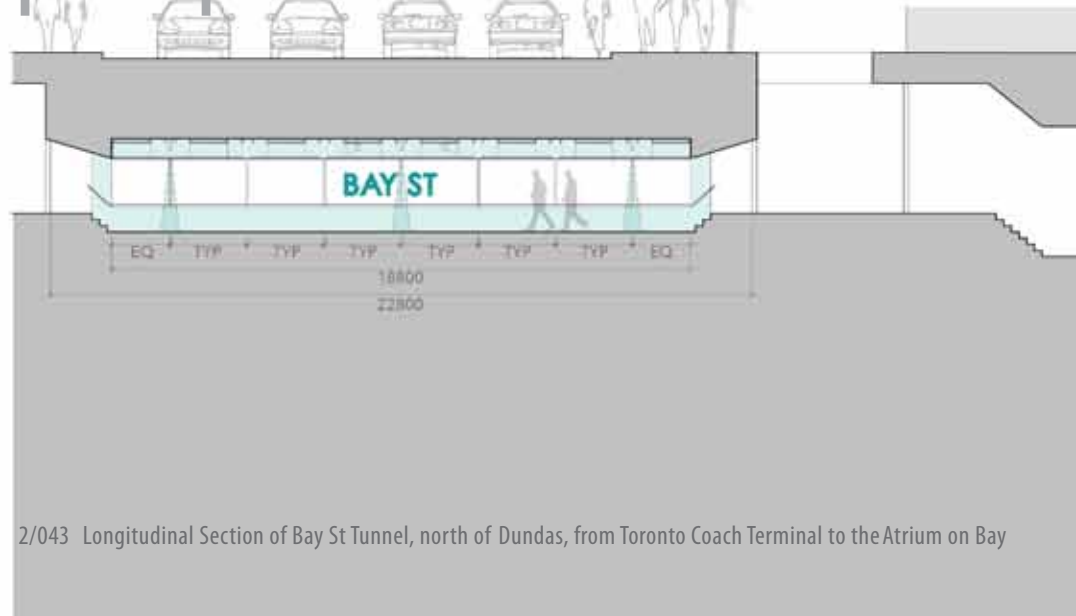
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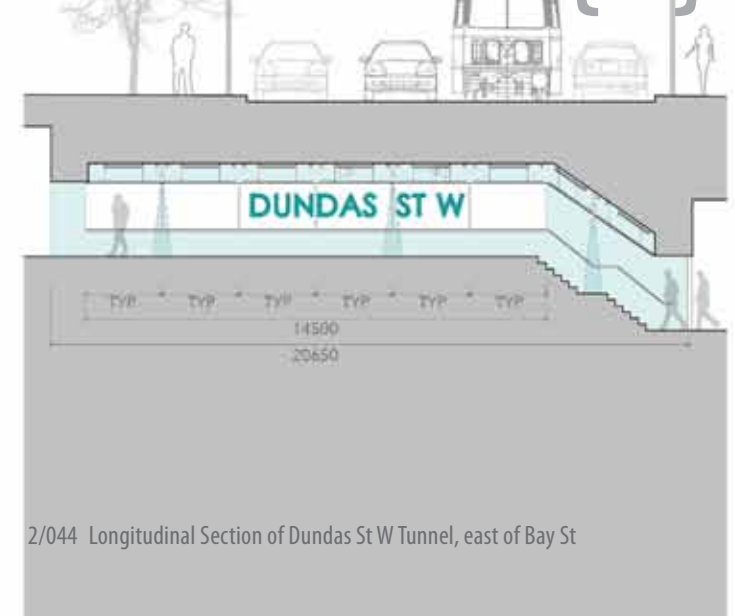
05

16

proposed tunnels union station (e)



2/043 Longitudinal Section of Bay St Tunnel, north of Dundas, from Toronto Coach Terminal to the Atrium on Bay



2/044 Longitudinal Section of Dundas St W Tunnel, east of Bay St



2/045 Existing Bay St Tunnel, north of Dundas St



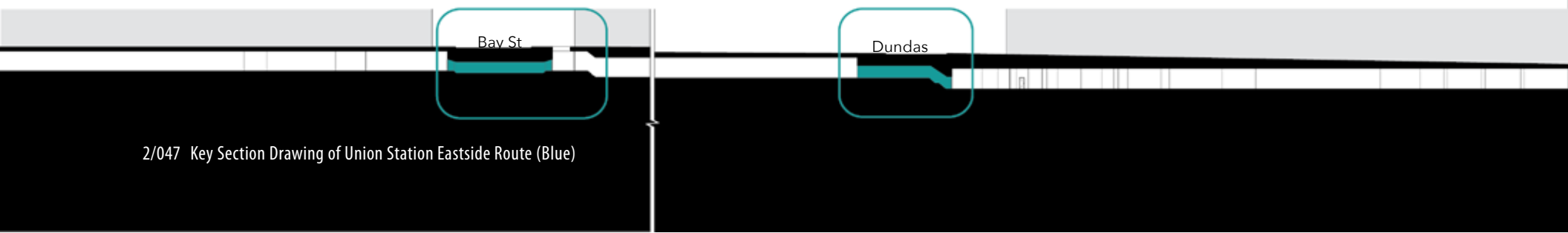
2/048 Proposed Bay St Tunnel, north of Dundas St



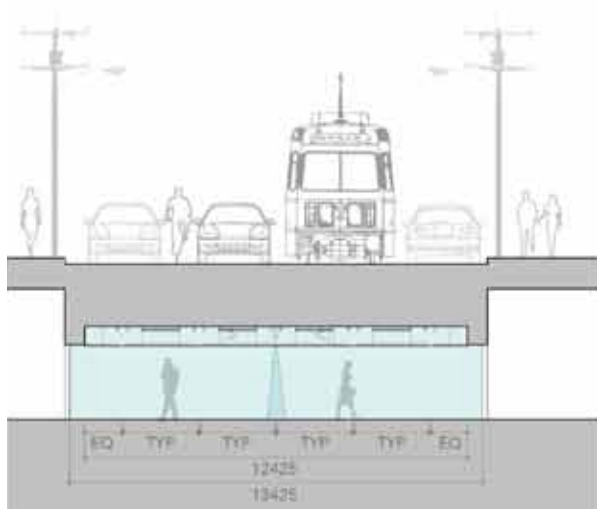
2/046 Existing Dundas St W Tunnel, east of Bay St



2/049 Proposed Dundas St W Tunnel, east of Bay St



2/047 Key Section Drawing of Union Station Eastside Route (Blue)



2/050 Longitudinal Section of Queen St W Tunnel, east of Bay St



2/051 Longitudinal Section of Richmond St W Tunnel, east of Bay St



2/052 Existing Queen St W Tunnel, east of Bay St



2/054 Proposed Queen St W Tunnel, east of Bay St



2/053 Existing Richmond St W Tunnel, east of Bay St



2/055 Proposed Richmond St W Tunnel, east of Bay St



proposed tunnels union station (e)



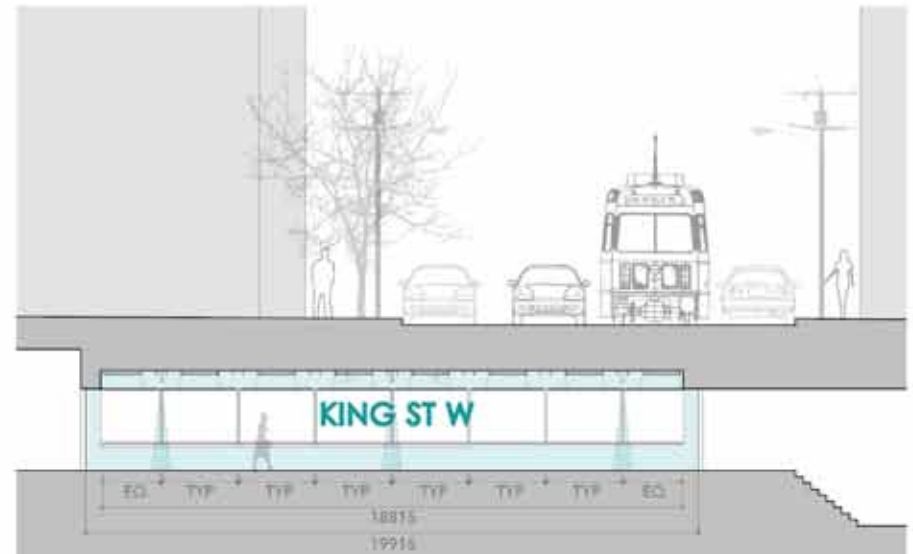
2/056 Longitudinal Section of Adelaide St W Tunnel, east of Bay St



2/058 Existing Adelaide St W Tunnel, east of Bay St



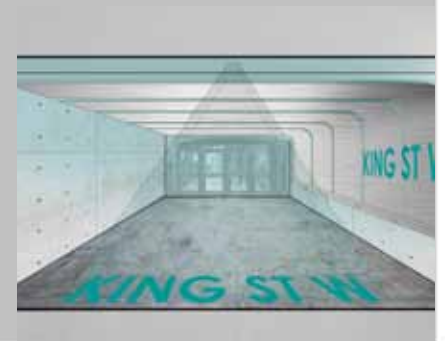
2/061 Proposed Adelaide St W Tunnel, east of Bay St



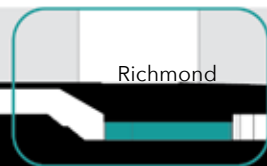
2/057 Longitudinal Section of King St W Tunnel, east of Bay St



2/059 Existing King St W Tunnel, east of Bay St



2/062 Proposed King St W Tunnel, east of Bay St



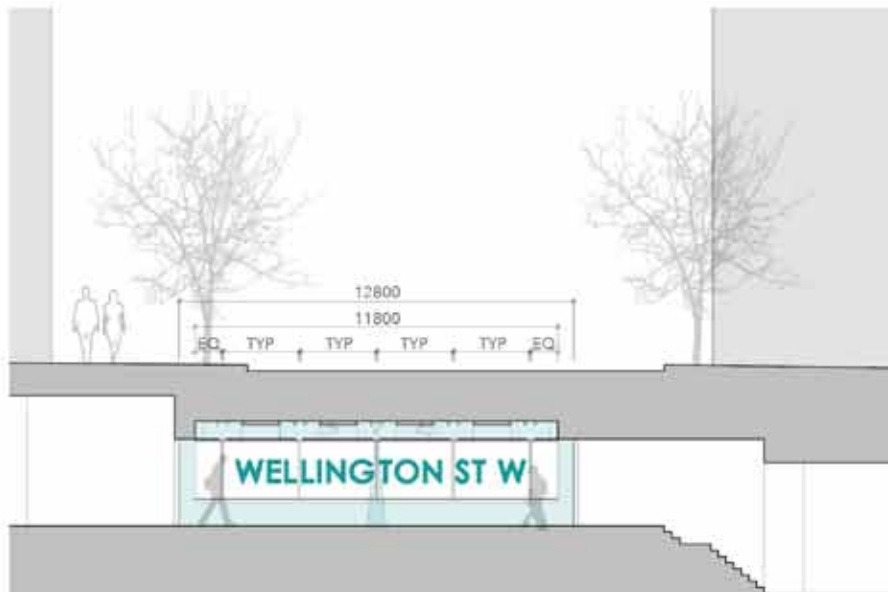
2/060 Key Section Drawing of Union Station Eastside Route (Blue) - continued



Adelaide



King



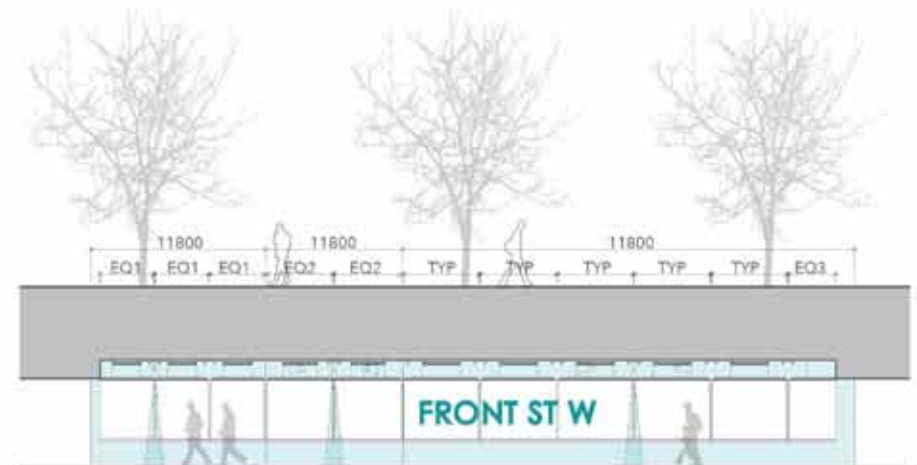
2/063 Longitudinal Section of Wellington St W Tunnel, east of Bay St



2/065 Existing Wellington St W Tunnel, east of Bay St



2/067 Proposed Wellington St W Tunnel, east of Bay St



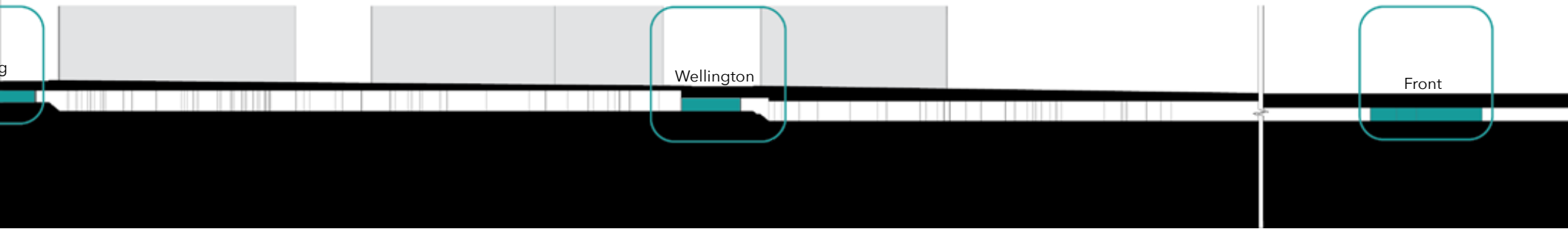
2/064 Longitudinal Section of Front St W Tunnel, east of Bay St



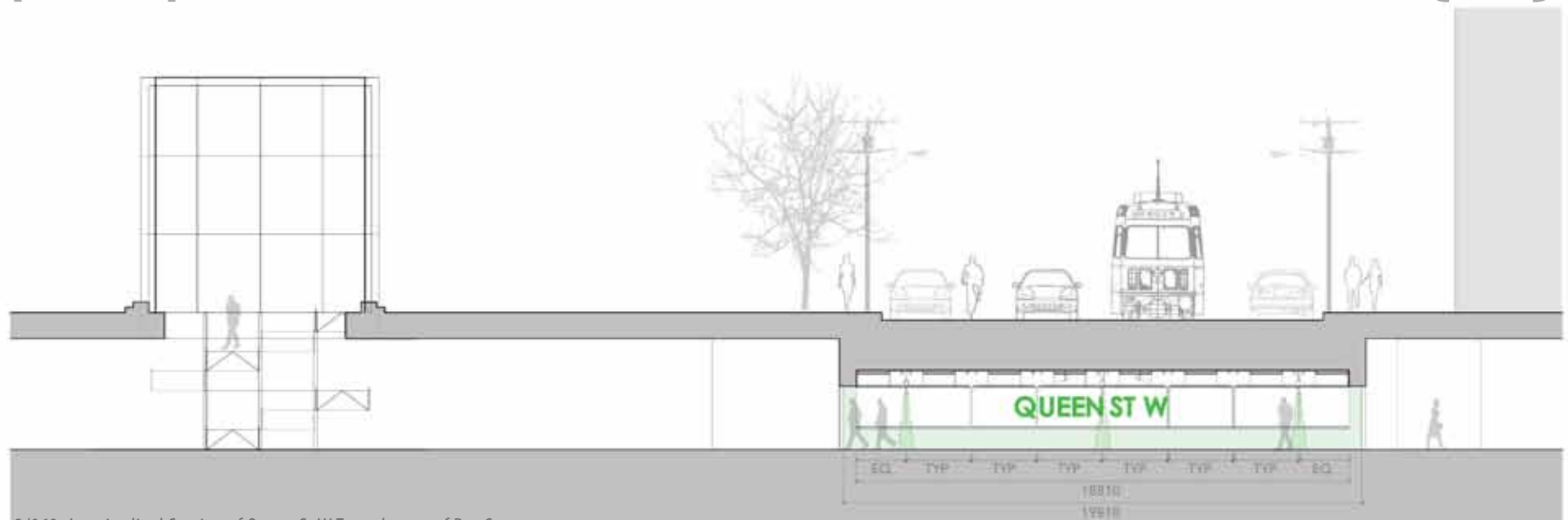
2/066 Existing Front St W Tunnel, east of Bay St



2/068 Proposed Front St W Tunnel, east of Bay St



proposed tunnels union station (w)



2/069 Longitudinal Section of Queen St W Tunnel, west of Bay St

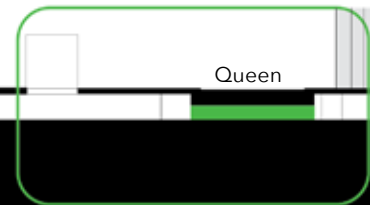


2/070 Existing Queen St W Tunnel, west of Bay St



2/072 Proposed Queen St W Tunnel, west of Bay St

2/071 Key Section Drawing of Union Station Westside Route (Green)





2/073 Longitudinal Section of Richmond St W Tunnel, west of Bay St



2/075 Existing Richmond St W Tunnel, west of Bay St



2/077 Proposed Richmond St W Tunnel, west of Bay St



2/074 Longitudinal Section of Adelaide St W Tunnel, west of Bay St



2/076 Existing Adelaide St W Tunnel, west of Bay St



2/078 Proposed Adelaide St W Tunnel, west of Bay St

Richmond

Adelaide

King

proposed tunnels union station (w)



2/079 Longitudinal Section of King St W Tunnel, west of Bay St



2/080 Existing King St W Tunnel, west of Bay St



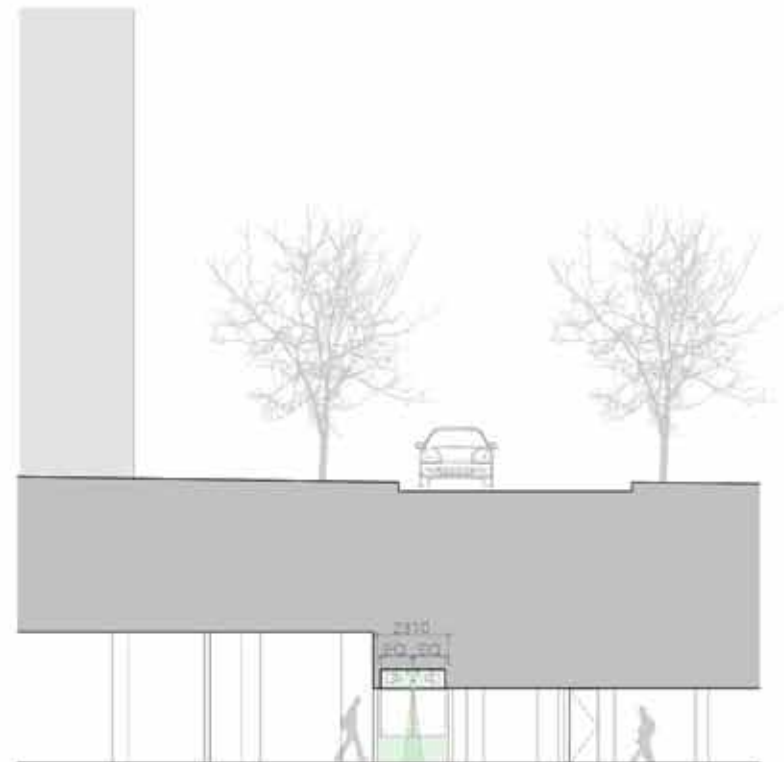
2/082 Proposed King St W Tunnel, west of Bay St



2/081 Key Section Drawing of Union Station Westside Route (Green) - continued



2/083 Longitudinal Section of Wellington St W, west of Bay St



2/084 Longitudinal Section of Front St W Tunnel, west of Bay St



2/085 Existing Wellington St W Tunnel, west of Bay St



2/087 Proposed Wellington St W Tunnel, west of Bay St

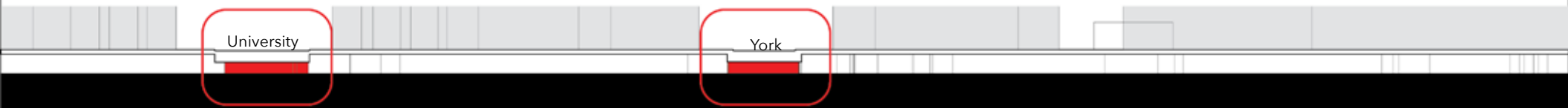


2/086 Existing Front St W Tunnel, west of Bay St

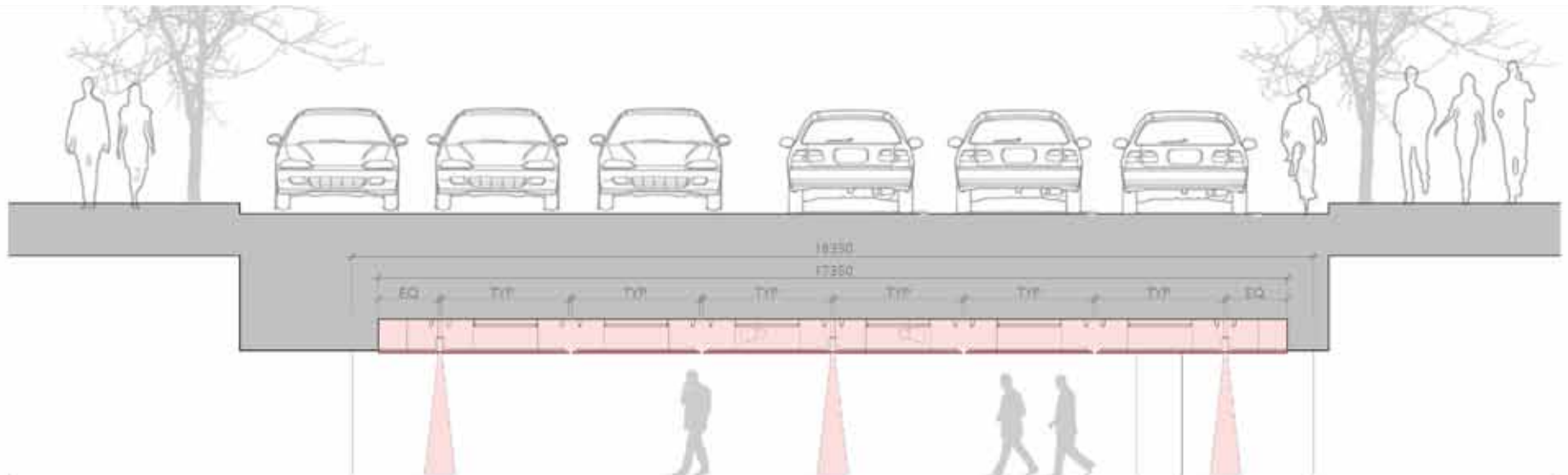


2/088 Proposed Front St W Tunnel, west of Bay St

proposed tunnels king alley (n)



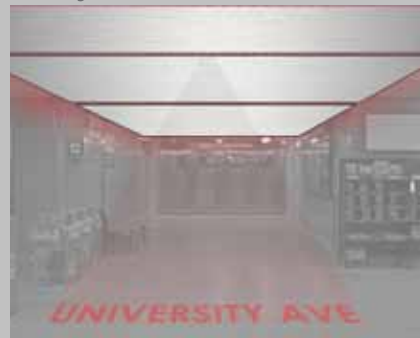
2/089 Key Section Drawing of King Alley North Route (Red)



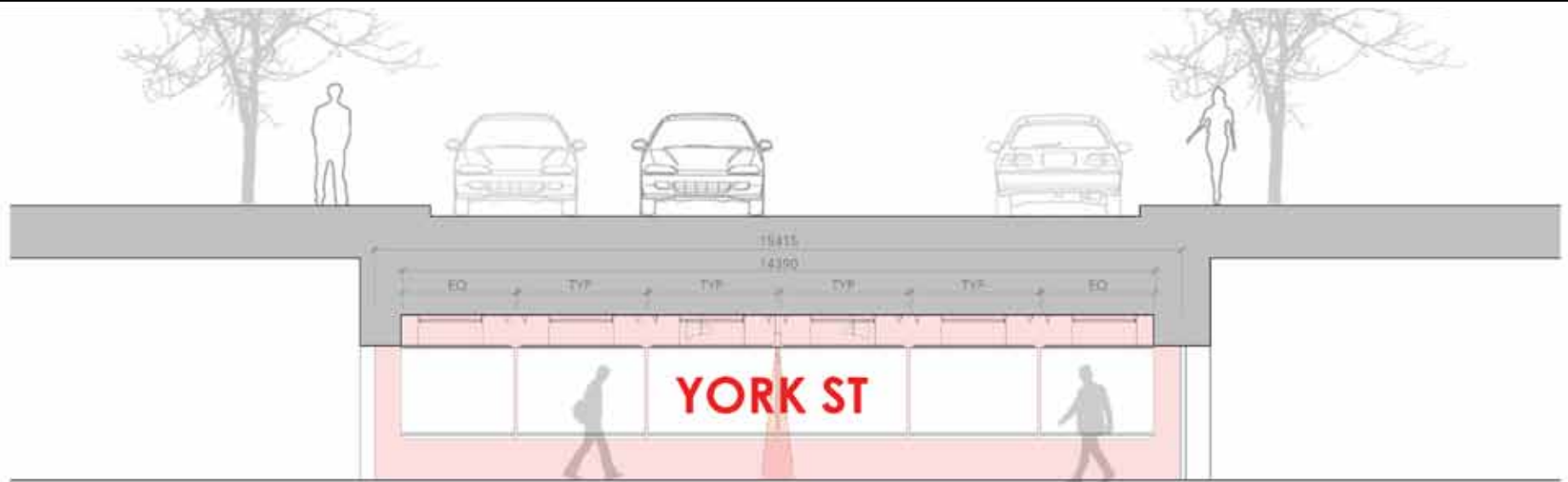
2/090 Longitudinal Section of Yonge St Tunnel, north of King St



2/091 Existing University Ave Tunnel, north of King St



2/092 Proposed University Ave Tunnel, north of King St



2/093 Longitudinal Section of Tunnel under York St, north of King St W

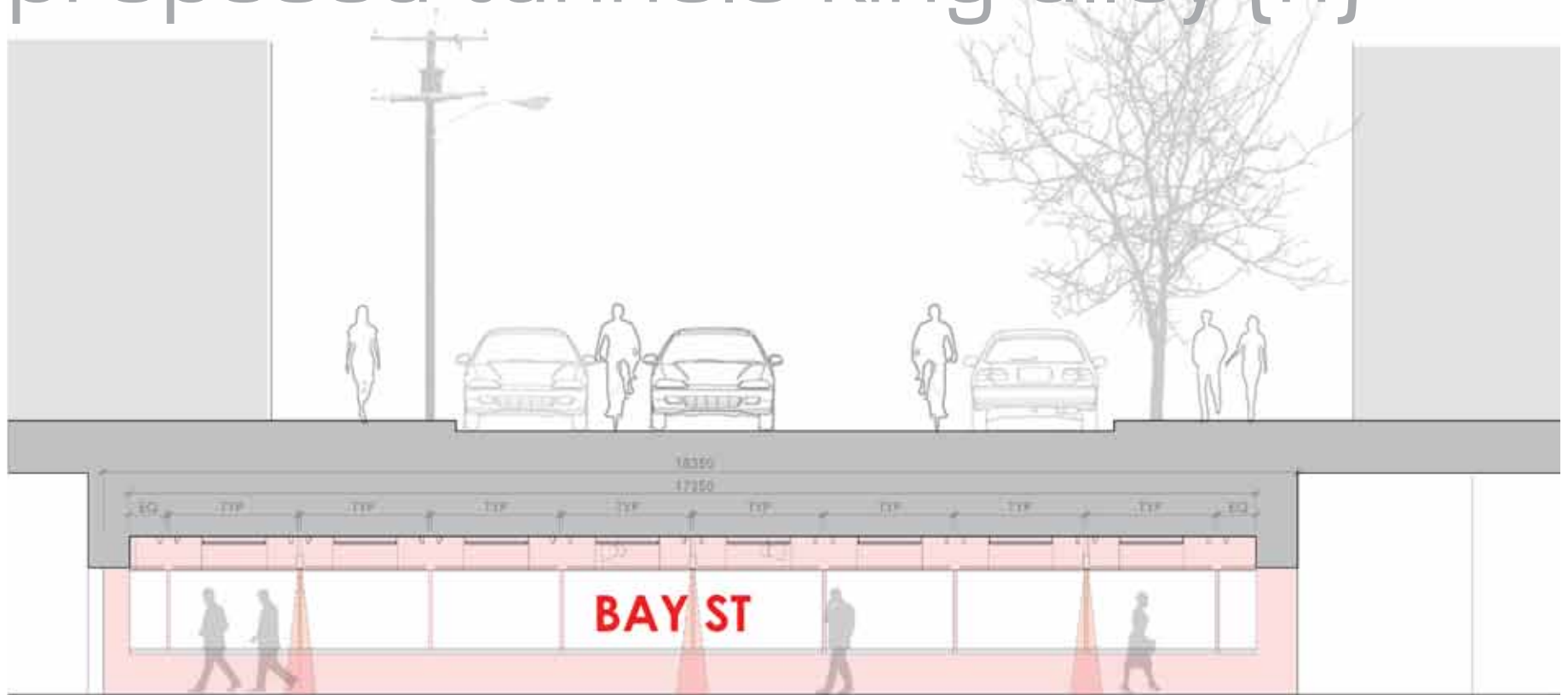


2/094 Existing York St Tunnel, north of King St



2/095 Proposed York St Tunnel, north of King St

proposed tunnels king alley (n)



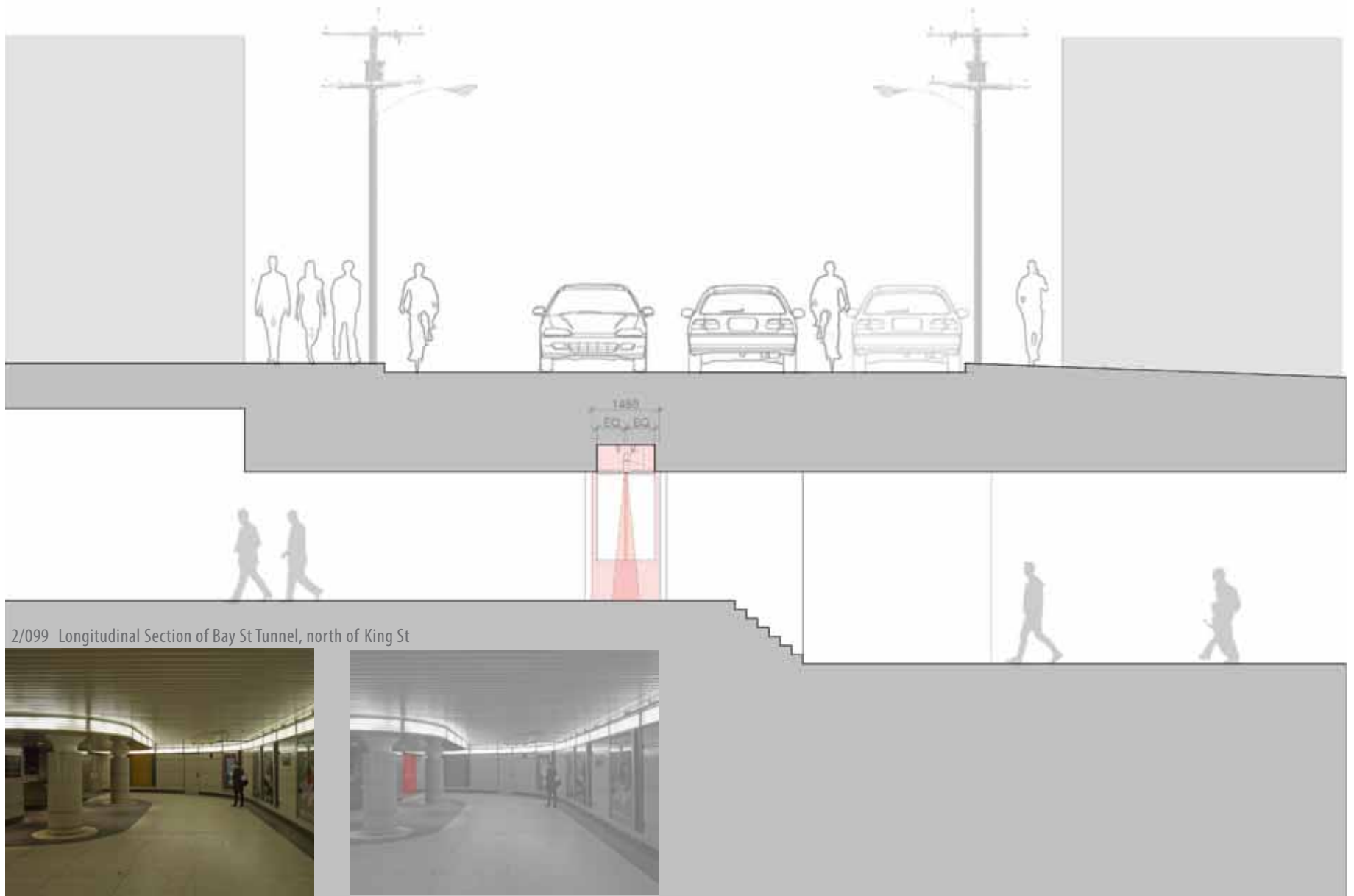
2/096 Longitudinal Section of Bay St Tunnel, north of King St



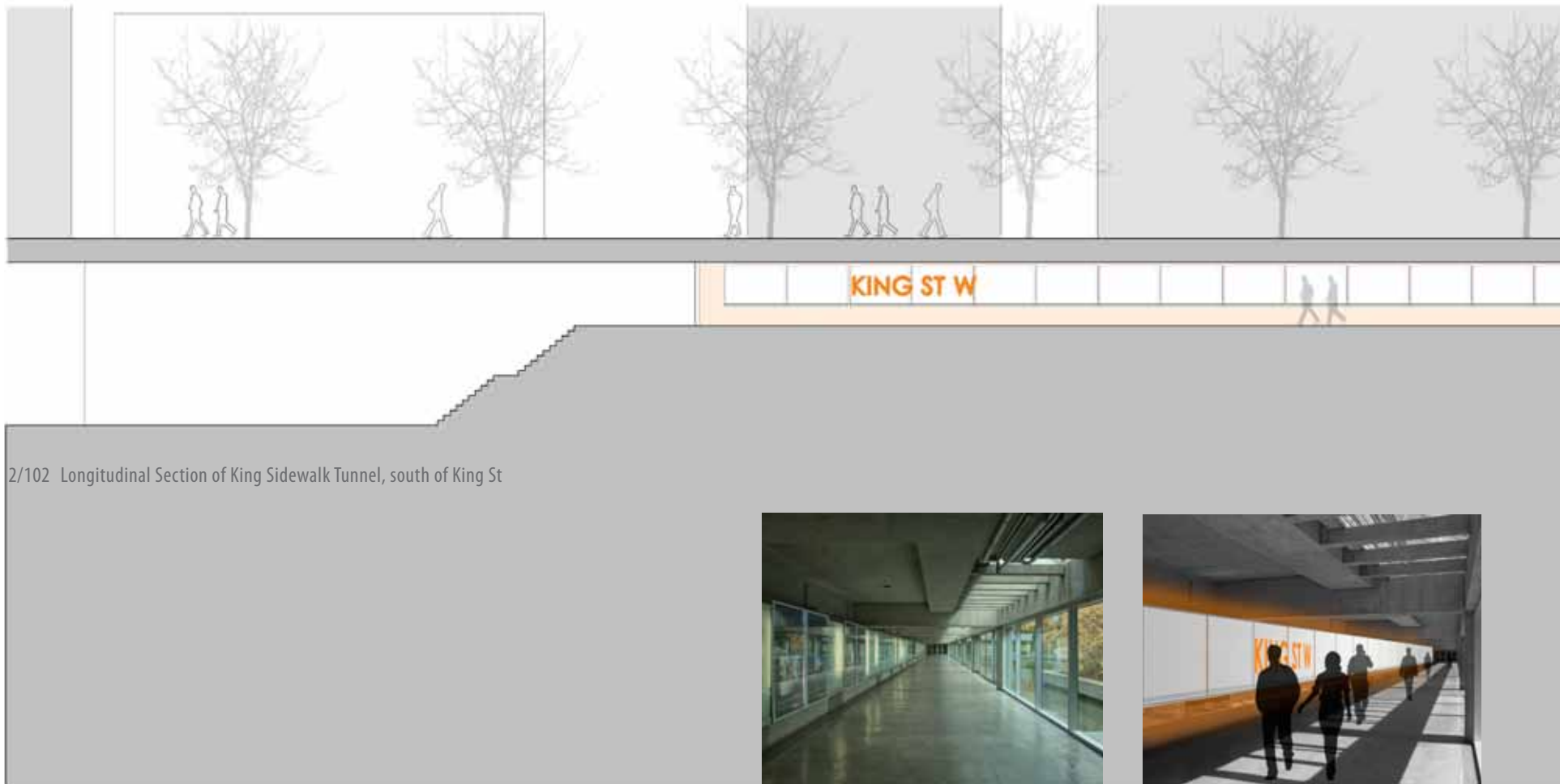
2/097 Existing Bay St Tunnel, north of King St



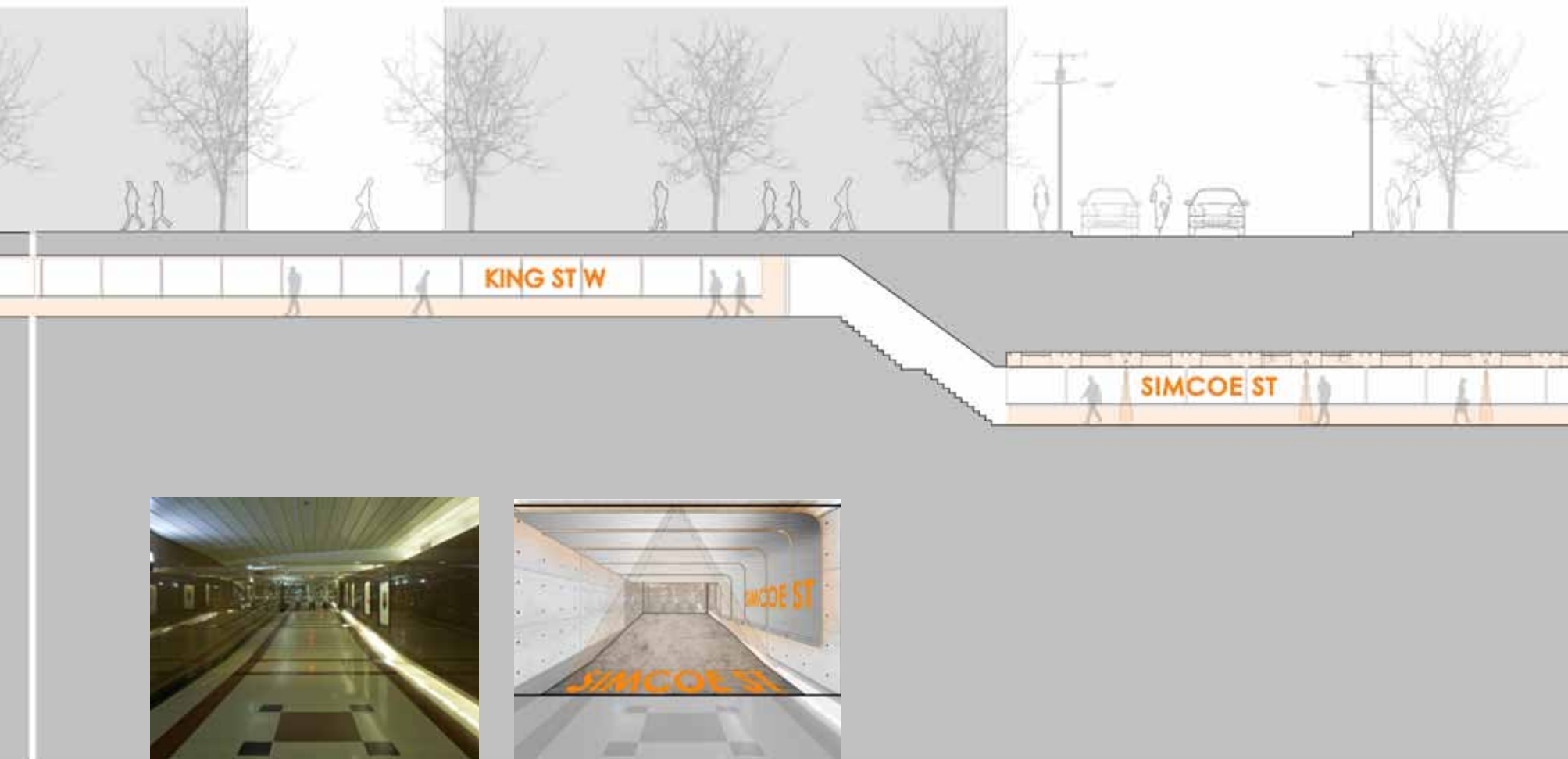
2/098 Proposed Bay St Tunnel, north of King St



proposed tunnels king alley (s)



2/103 Key Section Drawing of King Alley South Route (Orange)

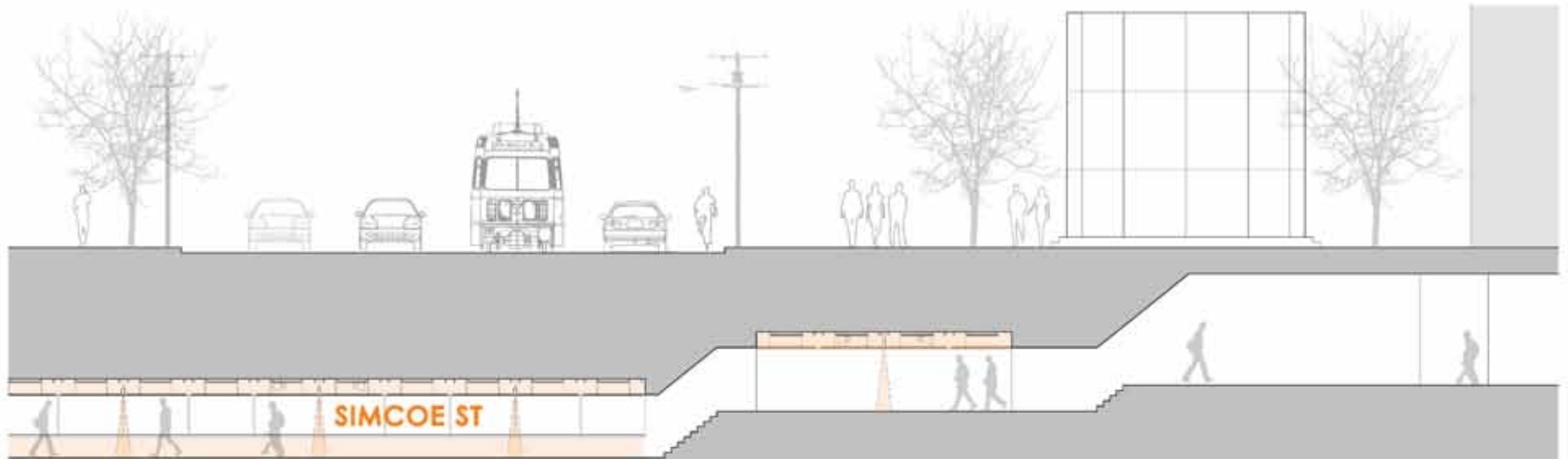


2/106 Existing Simcoe St Tunnel, south of King St

2/107 Proposed Simcoe St Tunnel, south of King St



proposed tunnels king alley (s)



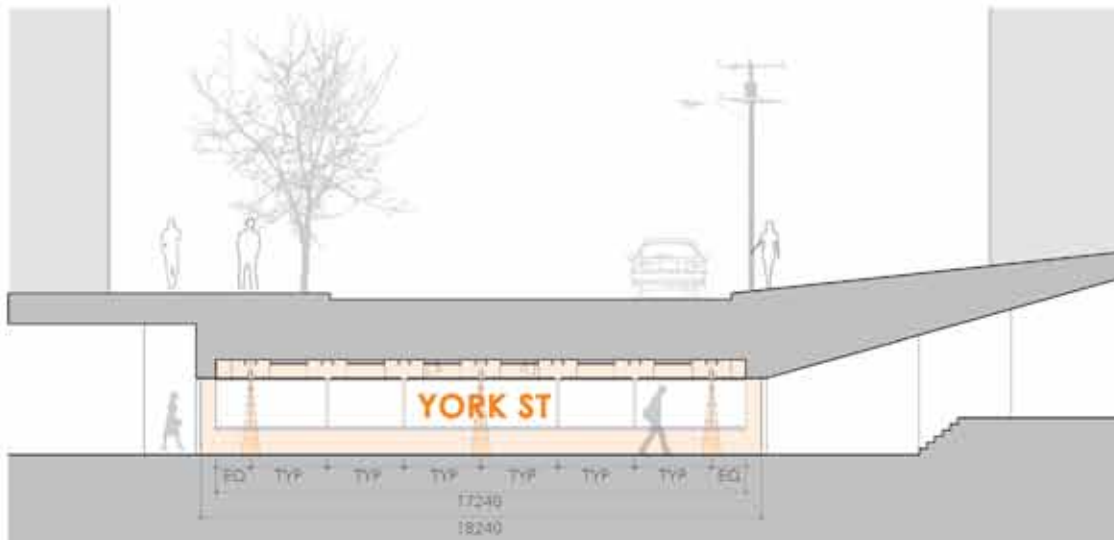
2/108 Longitudinal Section of Simcoe St Tunnel, south of King St



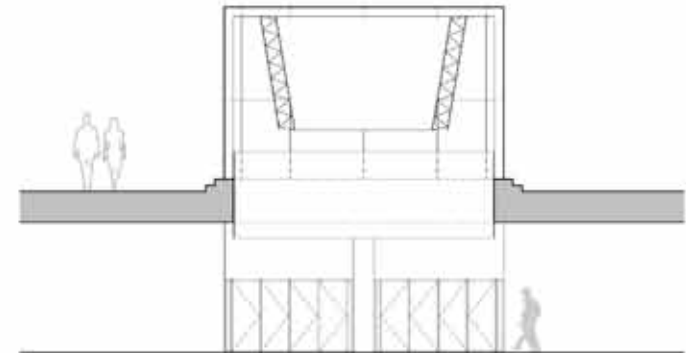
2/109 Existing University Ave Tunnel, south of King St



2/110 Proposed University Ave Tunnel, south of King St



2/111 Longitudinal Section of York St Tunnel, south of King St



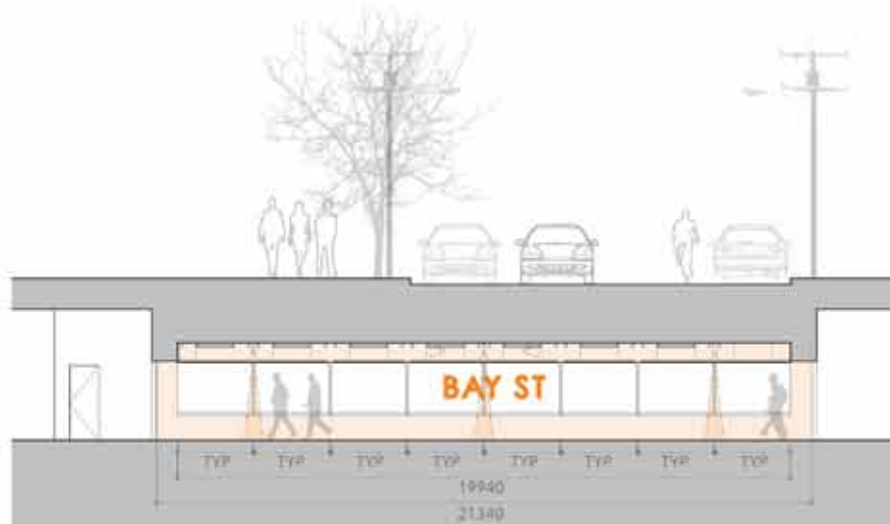
2/112 Section of Proposed Light Pavilion at TD Centre



2/113 Existing York St Tunnel, south of King St



2/114 Proposed York St Tunnel, south of King St



2/115 Longitudinal Section of Bay St Tunnel, south of King St



2/116 Longitudinal Section of Yonge St Tunnel, south of King St



2/117 Existing Bay St Tunnel, south of King St



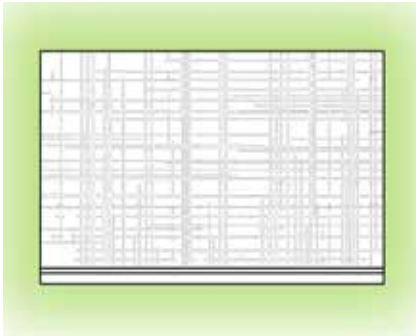
2/119 Proposed Bay St Tunnel, south of King St



2/118 Existing Yonge St Tunnel, south of King St



2/120 Proposed Yonge St Tunnel, south of King St



2/121 Material Texture of Green Route



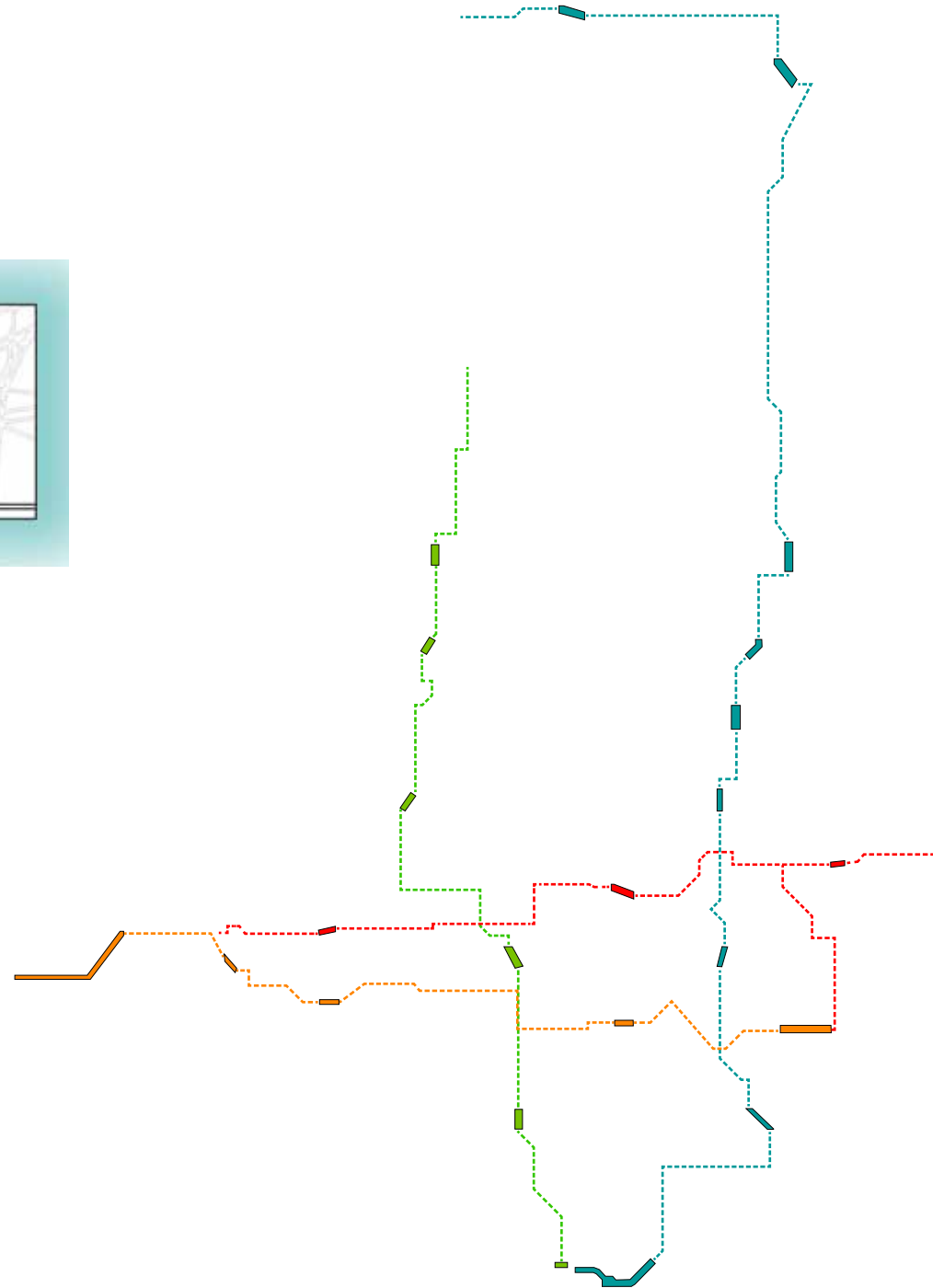
2/122 Material Texture of Blue Route



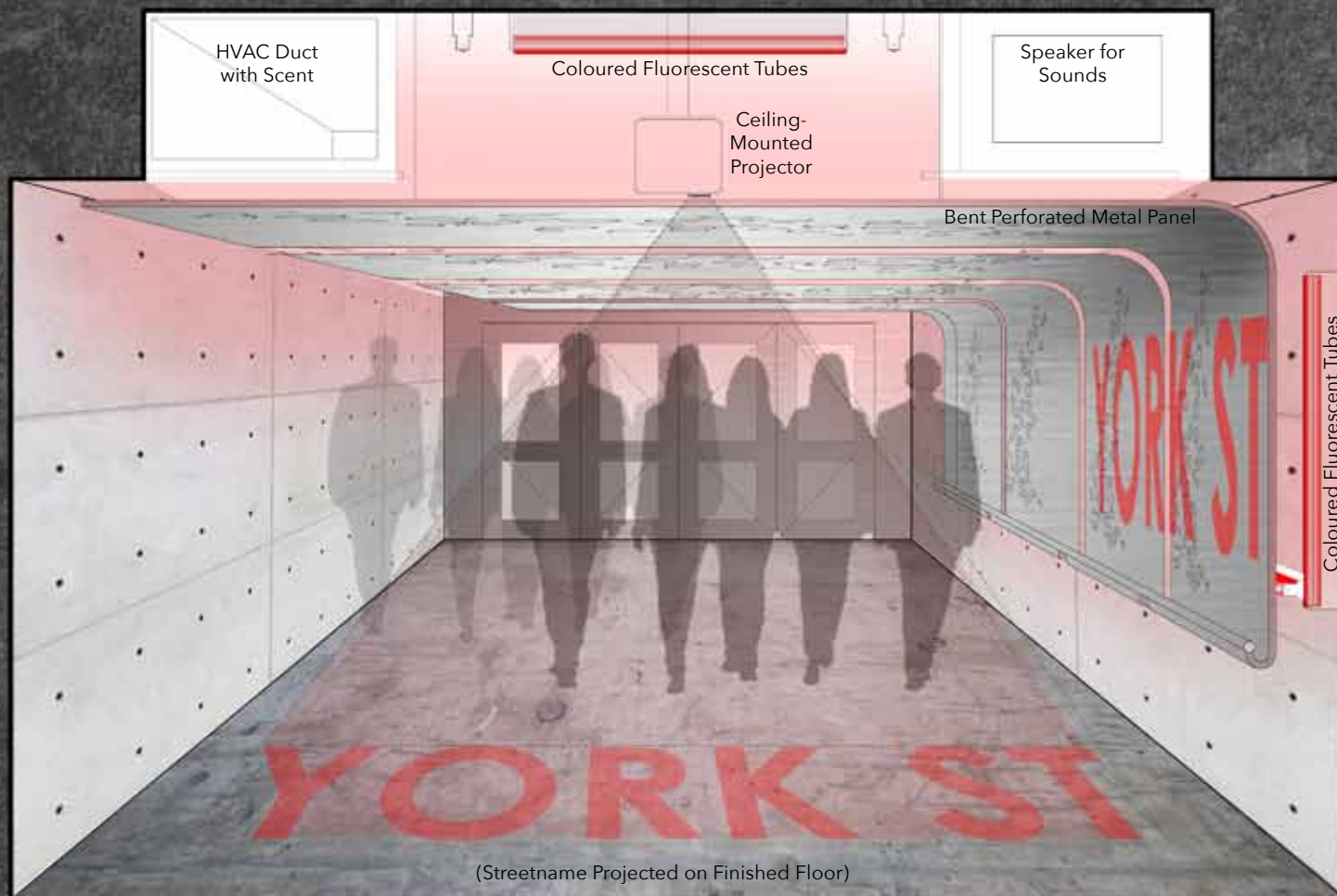
2/123 Material Texture of Red Route



2/124 Material Texture of Orange Route



2/125 Key Plan of Colour-Coded Routes





Speaker for
Sounds

Coloured Fluorescent Tubes

Coloured Fluorescent Tubes Behind

YORK ST

600

Varies
Min. 2438

900



toward sensing direction

"You know that we have lost the sense of space. We say 'space is annihilated', but we have annihilated not space, but the sense thereof."

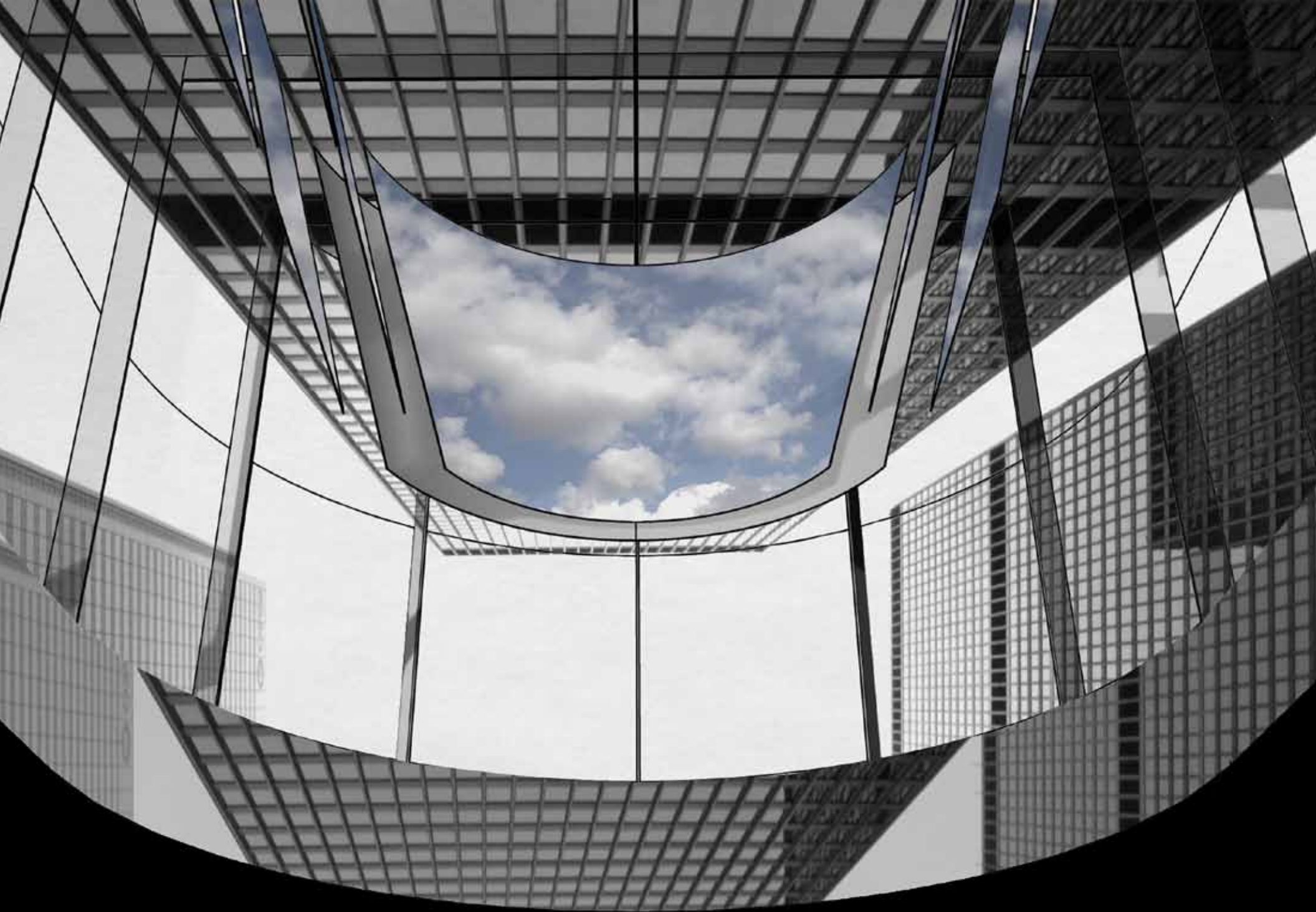
– EM Forster *The Machine Stops* 1909

The spatial experience of the PATH is a blur of monotonous interior spaces that lack visual cues. Devoid of natural light, notable landmarks and nodes, it is difficult for the brain to encode spatial memory as revealed in both navigational experiments.

As a way to create distinct features, the redesign of the understreet tunnels punctuates the PATH with a system of colours, textures, sounds and scents that arouse sensory perception to stimulate memory. This pattern could be easily remembered through direct experience and coded into memory by the grid cells. Obstacles in traversing the PATH and spatial orientation will be solved by the unique yet unifying experience of these artificial chambers of sensory infusion.

chapter two: endnotes

1. Ole Kiehn and Hans Forssberg. Scientific Background: The Brain's Navigational Place and Grid Cell System. Press Release, 2,4.
2. Lynch sought to determine place legibility by administering an experiment, which consisted of questionnaire surveys, and interviews. The survey include thirty people in a central area of Boston, and fifteen each in populous Jersey City and Los Angeles.
3. Gary L. Allen, ed. Human Spatial Memory: Remembering Where. (Mahwah, New Jersey: Lawrence Erlbaum Associates, 2004), 218.
4. Roger M. Downs and David Stea, ed. Image and Environment: Cognitive Mapping and Spatial Behaviour. (New Jersey: Aldine Transaction, 1973), 9.
5. Japan takes full responsibility for underground circulation at a municipal level. In North America, only 10-15% is under municipal jurisdiction. The rest is private property.
6. Edward K. Sadalla and Daniel R. Montello. "Remembering Changes in Direction." *Environment and Behavior*, Vol. 21, No. 3, May 1989, 346-363.
7. Ibid, 349.
8. Ibid, 351.
9. Lindy Goodman. "Streets Beneath the Towers: The Development of Toronto's Downtown Underground Pedestrian Mall System." Discussion Paper Number 31. Toronto: Dept. of Geography, York University, 1984, 25.
10. Gary L. Allen, ed. Human Spatial Memory: Remembering Where. (Mahwah, New Jersey: Lawrence Erlbaum Associates, 2004), 262.
11. Ibid, 218.
12. Mariam Adawiah Dzulkifli and Muhammad Faiz Mustafar. "The Influence of Colour on Memory Performance: A Review" *Malaysian Journal of Medical Science*, Mar-May 2013; 20(2): 4.
13. Ibid.
14. Ibid.
15. "Sensory Maps" last modified May 10, 2013, <http://www.thecommononline.org/sensory-maps>
16. Ferrinne Spector and Daphne Maurer. "Making sense of scents: the colour and texture of odours." *Seeing and Perceiving* Vol. 25 (2012), 662.



chapter three: surfacing

Artifacts either enable us to understand the city in its totality, or they appear as a series of isolated elements that we can link only tenuously to an urban system."

– Aldo Rossi *The Architecture of the City* 1966

As with most subterranean systems, the PATH does not get much recognition on street level. Ranging from low-key open stairwells to stand-alone pavilions, these entry points are monofunctional and often blend into their surroundings, making outdoor access to the PATH virtually invisible to the average person. An analysis of the organization and conditions of existing entrances into the PATH will emphasize the downfalls of the system. The current limited access to natural light is also documented and critiqued.

Case studies of successful subterranean spaces around the world will be investigated to inform the design and implementation of openings into the PATH. The sites studied bring maximum light downstairs while adding a sculptural quality to the surface, carefully merging interior and exterior spaces and creating transparency to the underground. These structures

become distinct markers in the cityscape while not causing major visual or physical disruptions to the streetscape. Projects selected come from all different times and locations to capture the recurring themes used in solving the issue of designing effective subterranean entrances.

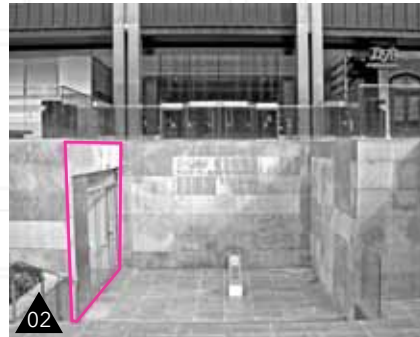
Similar to the tunnels, the entrance pavilions will be articulated as a consistent icon of the PATH and a conductor of light, bringing sunlight to the subterranean level during the day while emanating artificial light to the streets during the night. Insertion of new light wells via analogue and technological means will further increase the amount of natural light reaching the spaces below.

Eight sites are selected as candidates for varying levels of implementation of the three major tactics gleaned from the case studies. The new entrance pavilions will be strategically positioned to provide vertical connections at critical junctions in the underground terrain as well as serve as clearly visible elements on street level.

existing PATH entrances



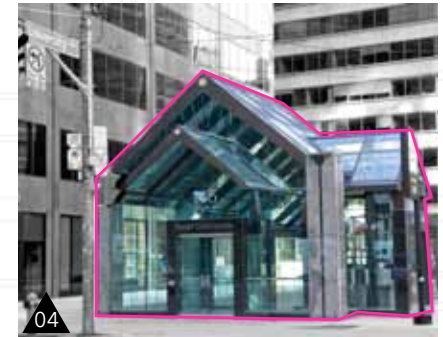
3/002 Richmond-Adelaide Centre



3/003 Richmond-Adelaide Centre



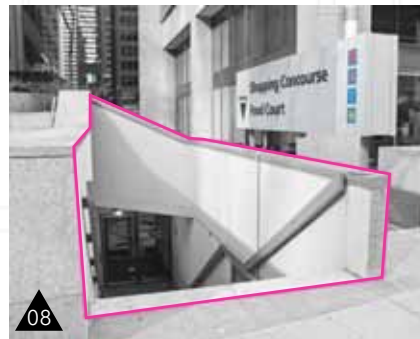
3/004 Metro Hall Entrance Pavilion on King



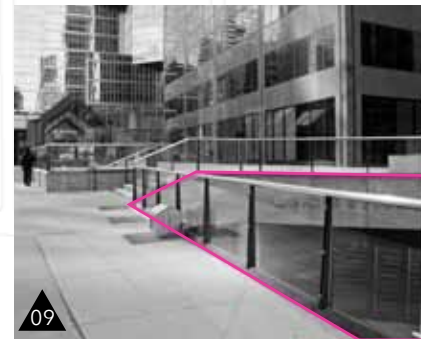
3/005 145 King St W Entrance Pavilion



3/008 Scotia Plaza



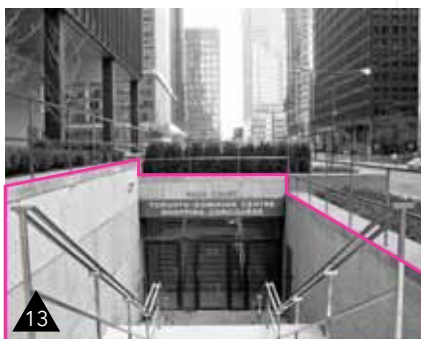
3/009 145 King St W



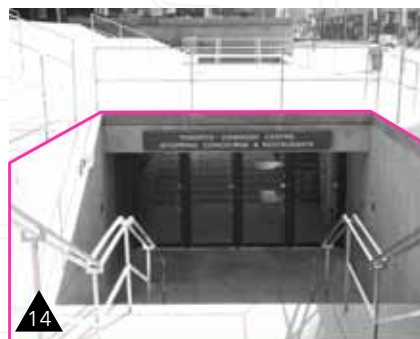
3/010 145 King St W



3/011 Standard Life Centre



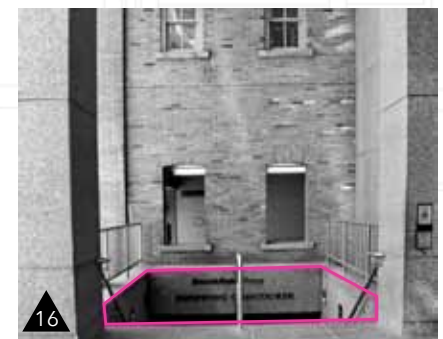
3/014 TD Centre on Wellington



3/015 TD Centre on Wellington



3/016 Royal Bank Plaza



3/017 Brookfield Place



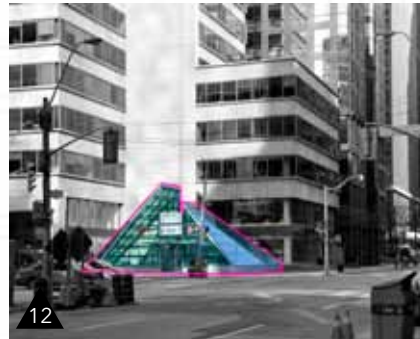
3/006 145 King St W Entrance (demolished)



3/007 TD Centre on King



3/012 Metro Hall Entrance Pavilion on Wellington



3/013 55 University Ave

3/018 Map of Existing PATH Entrances





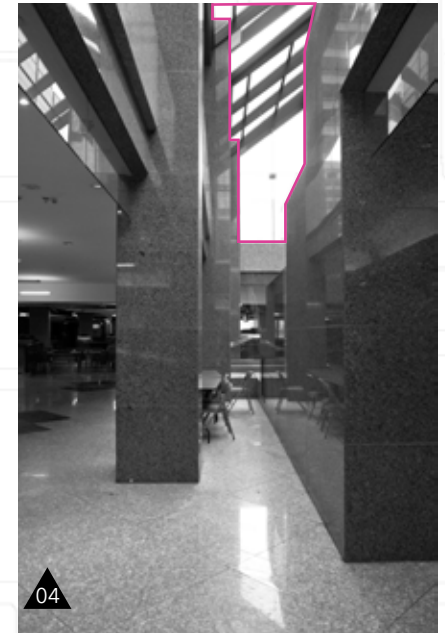
01
3/019 The Eaton Centre



02
3/020 Scotia Plaza



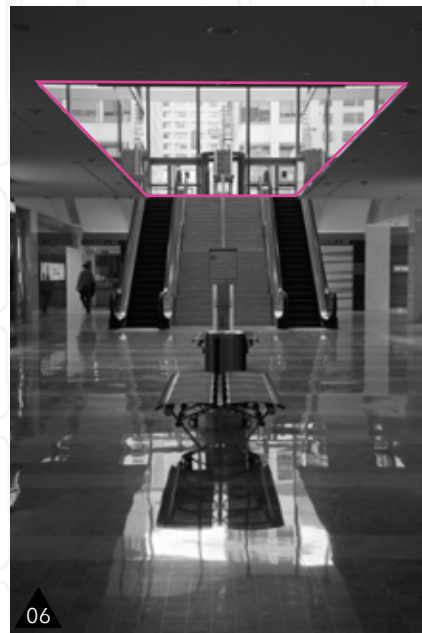
03
3/021 Commerce Court



04
3/022 145 King St W



05
3/023 Exchange Tower Food Court

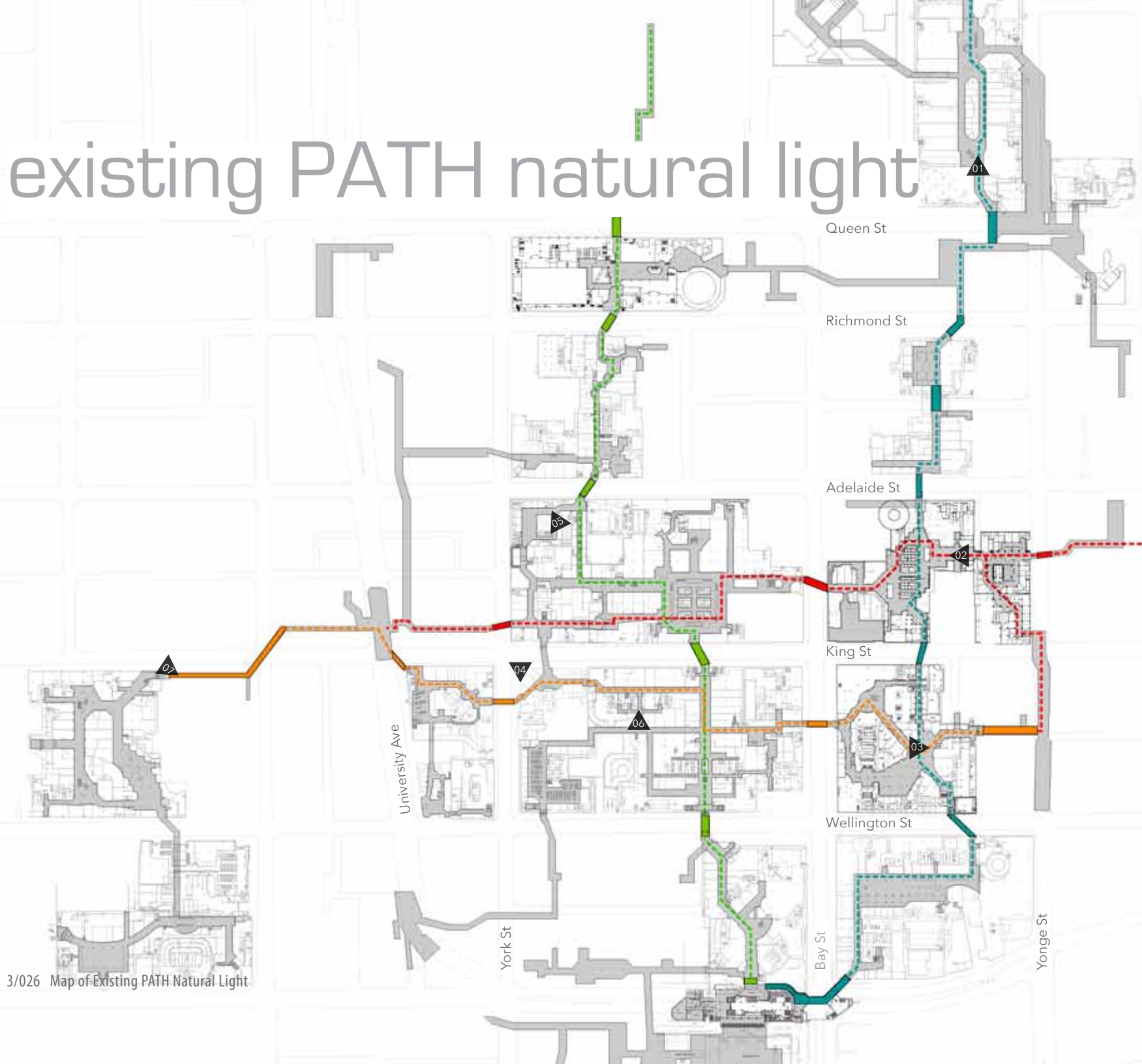


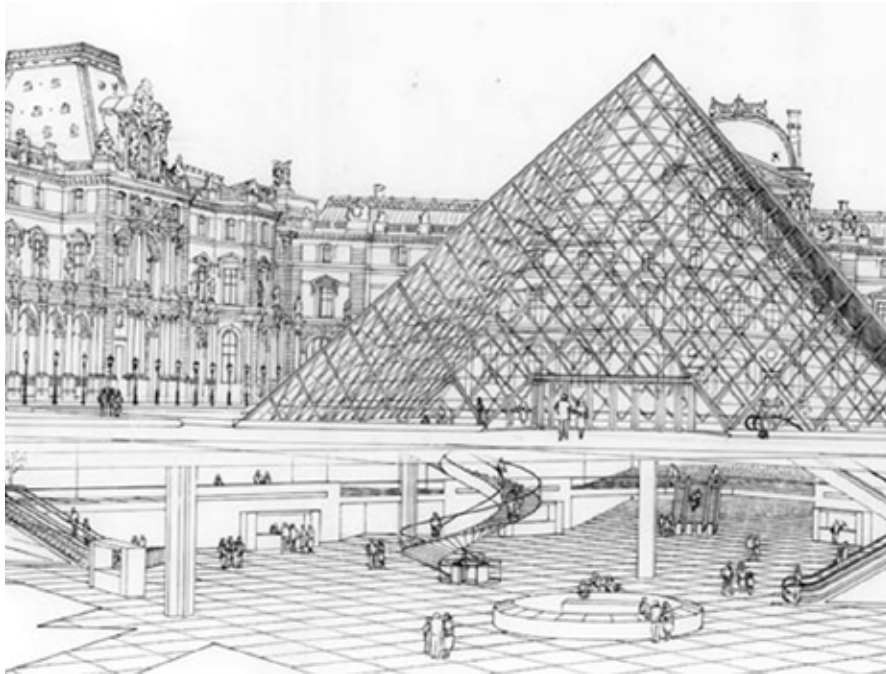
06
3/024 First Canadian Place



07
3/025 King Sidewalk Tunnel

existing PATH natural light

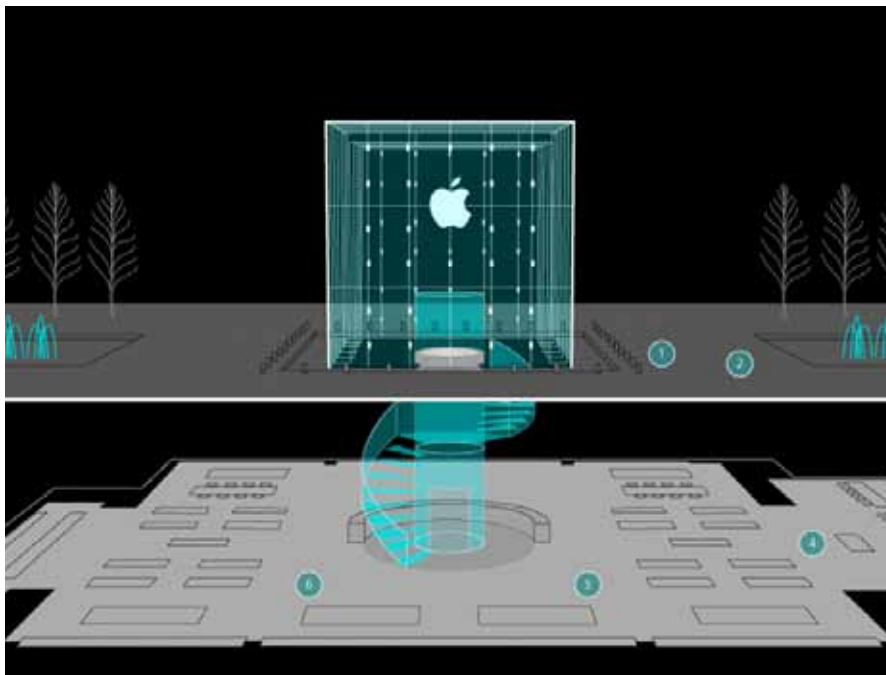




3/027 Sectional Perspective of the Louvre Pyramid



3/028 The Louvre Pyramid at Night



3/029 Sectional Perspective of the Apple Store



3/030 Glass Spiral Staircase Entrance at the Apple Store

case studies: entrances + subterranean spaces

The Louvre Pyramid - Paris, France

Completed: 1989 by I.M. Pei

The Louvre Pyramid is a large glass and metal pyramid that serves as the main entrance to the Louvre Museum. Surrounded by three smaller pyramids in the main courtyard of the Louvre Palace in Paris, its construction had been ignited by a surge in tourism in the 1970s and was the solution to the confusing layout of the entrances and exits. With the relocation of the Ministry of Finance, the Louvre Museum was able to occupy the entire U-shaped building. I.M. Pei's design merged all wings with a common access point.¹

The structure, consisting of 603 rhombus-shaped and 70 triangular glass segments, reaches a height of 21.6 metres and its square base has sides of 35 metres.² Glass allows for maximum transparency while its large size ensures its visibility from the ground plane. The Louvre Pyramid, with its futuristic edifice in the simple form of a pyramid, stands in stark contrast against the classical backdrop of the main building. It evokes a sculptural quality in its context. Visitors enter the pyramid, descending into a spacious lobby before reascending into the buildings of the Louvre Museum.

The Apple Store on Fifth Avenue - New York City, USA

Completed: 2006 by Bohlin Cywinski Jackson

The Apple Store under the glass cube at the base of the GM Building is one of the most visited retail stores in the world. After the purchase of the iconic GM Building in 2003, the developer's first concern was to tackle the useless open space that extended from the front entrance to Fifth Avenue. A 32'x32' clear glass cube was placed in the middle of the problematic plaza, mimicking the Louvre Pyramid with its transparent, sculptural aesthetic. It transformed a basement space that had been underused for

forty years into a high-grossing retail site.³

The Jubilee Line Extension - London, UK

Completed: 1999 by Roland Paoletti

The Jubilee Line Extension is the continuation of the London Underground Jubilee Line from Green Park to Stratford through south and east London. Enormously high ceilings and spacious interiors of polished metal panels and moulded concrete designed for future high usage renders the extension radically different from the rest of the London Underground. The vaulted underground spaces of Canary Wharf station resemble a contemporary cathedral while Westminster station has a vertical void that is forty metres deep.

Natural light from the entrance pavilions and light shafts allow for natural light to be filtered into the subterranean spaces, nearly reaching the platforms. Bermansey station and Canada Water station are particularly good examples of this. Although every station was designed by a different architect, the line extension is unified by a common design philosophy and a shared aesthetic.

Jubilee Park, Canary Wharf Station - London, UK

Completed: 2002 by Wirtz Internation N.V. (park)

1999 by Foster + Partners (station)

Jubilee Park is a landscaped park built as the roof of the 300 metres long Canary Wharf Underground Station.⁴ The only visible station elements are the arcing glass canopies that cover its three entrances and draw daylight deep into the concourse. By concentrating natural light at these points, orientation is enhanced and the need for directional signage is reduced.

The central feature is a raised serpentine water channel with rough stonewalls. Jubilee Park represents Canary Wharf's principal recreation area and green space in this financial district.

the jubilee extension



3/031 Bermondsey Station



3/032 Canada Water Station



3/033 Canada Water Station



3/037 Southwark Station



3/038 Bermondsey Station



3/039 Bermondsey Station



3/040 Bermondsey Station





3/034 North Greenwich Station



3/035 Canning Town Station

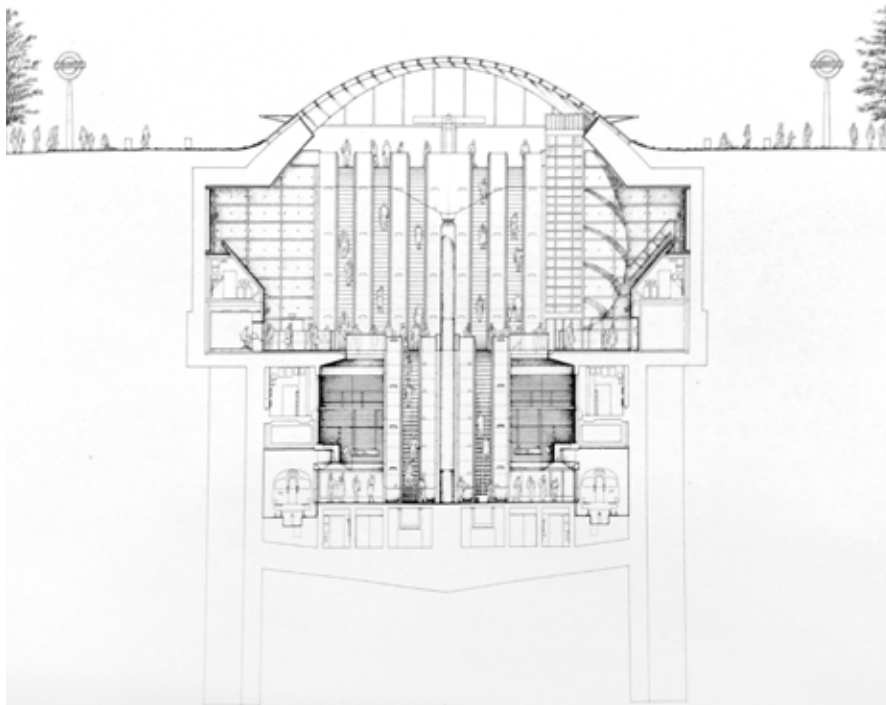


3/036 West Ham Station



3/041 Map of Jubilee Line Extension

the jubilee park



3/042 Section Drawing of Canary Wharf Tube Station Entrance



3/043 Aerial View of Jubilee Park



3/044 Entrance to Canary Wharf Tube Station



3/047 Entrance to Canary Wharf Tube Station



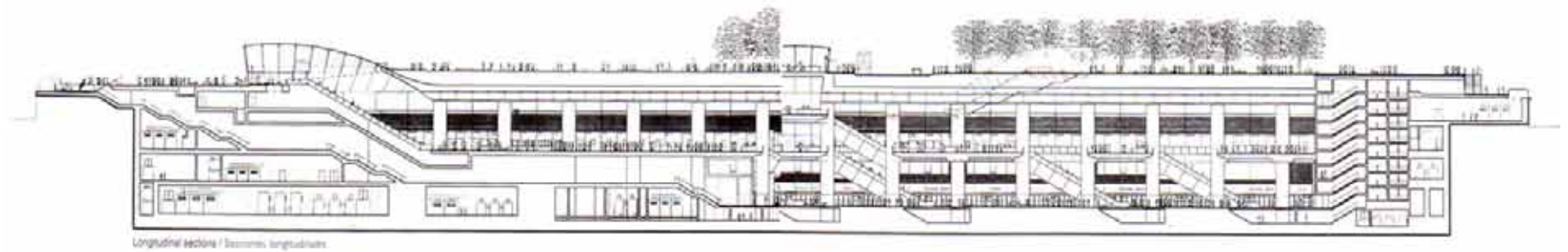
3/048 Canary Wharf Tube Station Platform



3/045 Entrance to Canary Wharf Tube Station



3/046 Entrance to Canary Wharf Tube Station



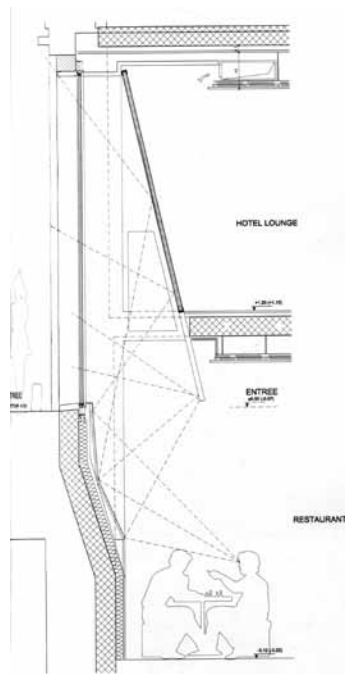
3/049 Section Drawing of Jubilee Park with Canary Wharf Station Underneath



3/050 Fünf Höfe Shopping Arcade in Munich



3/051 Fünf Höfe Shopping Arcade in Munich



3/052 Section Drawing of the Mirrors in the Restaurant at The Hotel



3/053 Restaurant in The Hotel in Lucerne

case studies: natural light through analogue means

Fünf Höfe - Munich, Germany

Completed: 2003 by Herzog + de Meuron

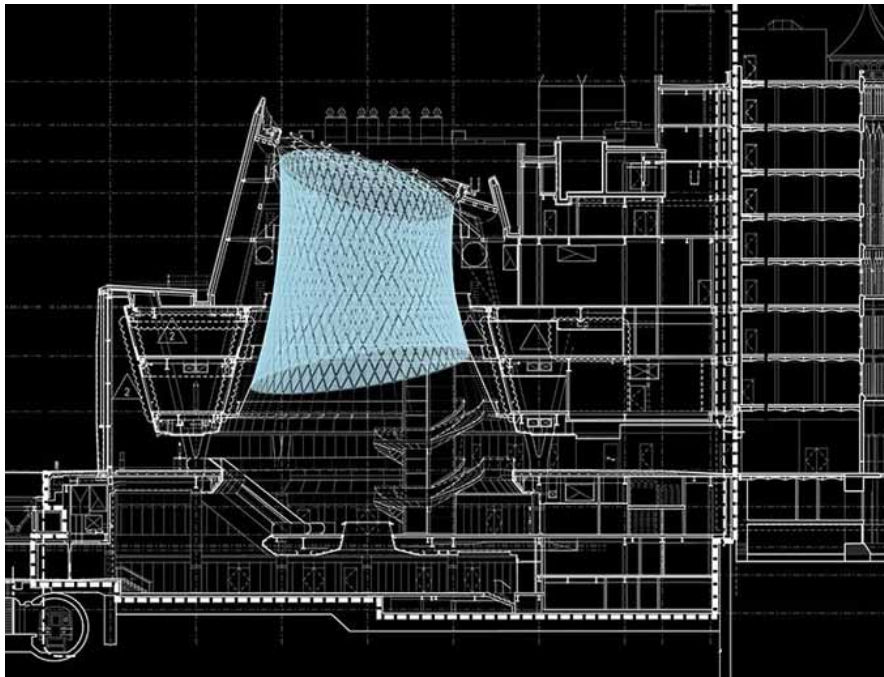
Fünf Höfe literally means five courtyards. The Höfe is a typical European interpretation of the North American shopping mall. Linked by a series of courtyards, shops, restaurants and cafés sprout from the surrounding buildings. The tunnel-like arcades are characterized by vaulted spaces with glass sequins set into the plastered walls and ceilings, which glisten in the oblique light. Four cuts are made into the plaster to allow light to enter the passage from existing openings in the façade.

The exterior skin of Haus Theatinerstrasse 8, the only new building in the complex, changes depending on the time of day and the lighting, the building oscillates between open and closed, light and heavy, bright and dark, metallic and textile.⁵

The Hotel - Lucerne, Switzerland

Completed: 2000 by Jean Nouvel

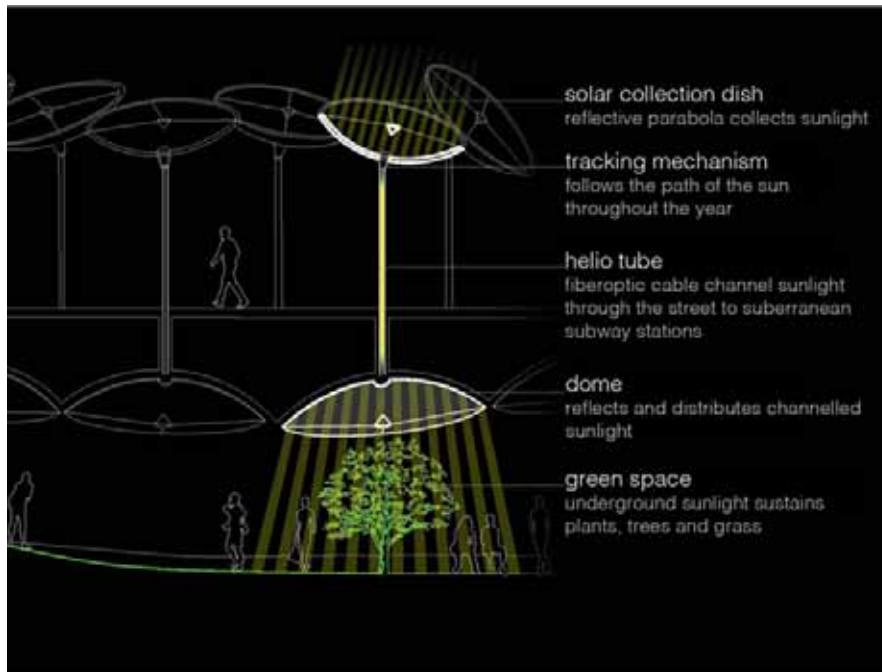
The Hotel is a boutique hotel renovation housed in a small corner property built in 1907. Natural light is transferred from the street down into the basement restaurant through the use of angled mirrors. Street activity animates the subterranean space while people on the sidewalk have a voyeuristic impression of the interior.⁶



3/054 Section Drawing of The Fulton Center



3/055 The Sky Reflector-Net



3/056 Section Drawing of the Lowline Solar Collector



3/057 The Lowline Exhibition - Proof of Concept

case studies: natural light through technological means

The Sky Reflector-Net at the Fulton Center - New York City, USA

Completed: 2014 by James Carpenter Associates

The Sky Reflector-Net at the Fulton Center, a transit centre and retail complex at the intersection of Fulton Street and Broadway in Lower Manhattan, New York City, is the largest individual artwork commissioned by the New York Metropolitan Authority's Arts for Transit and Urban Design division. It is made up of 952 perforated aluminum panels, either rhombus-shaped or triangular, with the largest panel measuring 2.5 metres high. Each panel reflects approximately ninety-five percent of the light that strikes it.⁷

The Sky Reflector-Net's form and orientation is designed to intake as much natural light as possible while its metal lining projects this light down to the lowest depths of the station. At night, it is lit from within through interactive artificial lighting, creating a glowing heart to the building.

The Lowline - New York City, USA

First Proposed: 2011 by James Ramsey and Dan Barasch

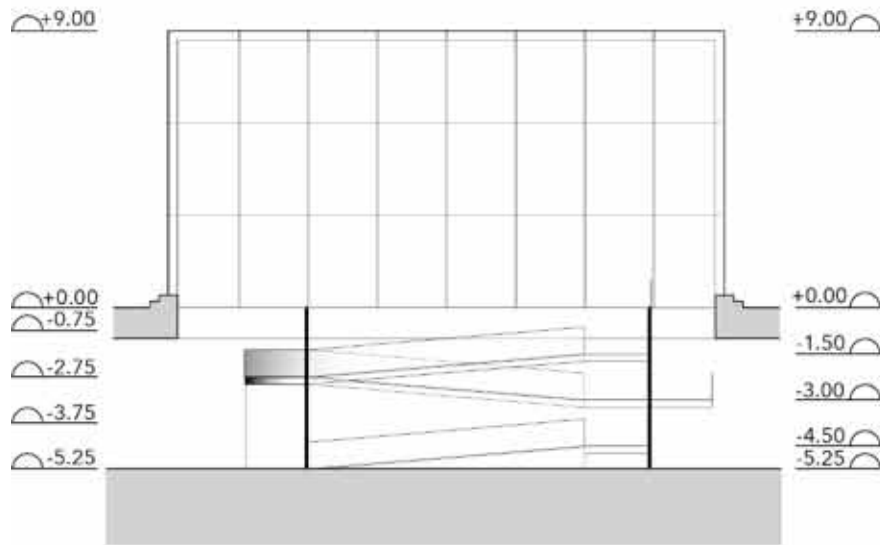
Projected Date of Completion: 2018

The Lowline is a proposed underground park that would inhabit the historic Williamsburg Bridge Trolley Terminal, just below Delancey Street on the Lower East Side of Manhattan. Opened in 1908, the site was abandoned in 1948 when trolley service was discontinued. The space retains architectural features like vaulted ceilings and cobblestone flooring.

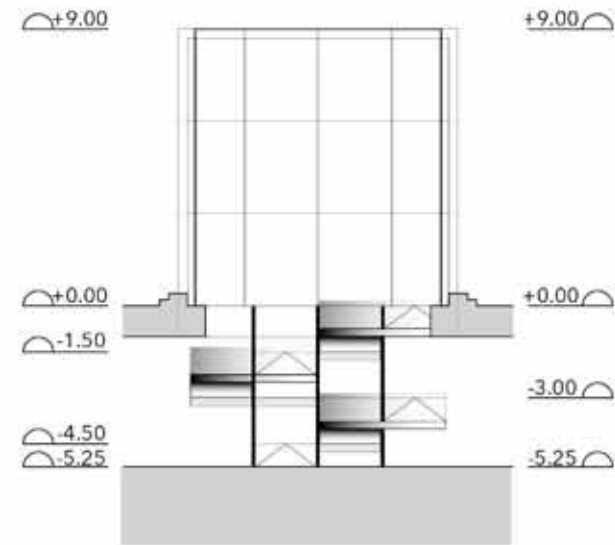
The proposed solar technology involves the creation of a "remote skylight." Sunlight enters a parabolic collector, gathers at a focal point, transmits through a conduit, and diffuses underground through a distributor dish. This technology will bring sunlight into a subterranean space, enabling photosynthesis and therefore allowing plants and trees to grow.

In September 2012, the concept of this solar technology was proven when a full-scale prototype was built and displayed at the "Imagining the Lowline" exhibit. The projected completion date is 2018. Once built, the Lowline would be a dynamic cultural space, featuring a diversity of community programming and youth activities.⁸

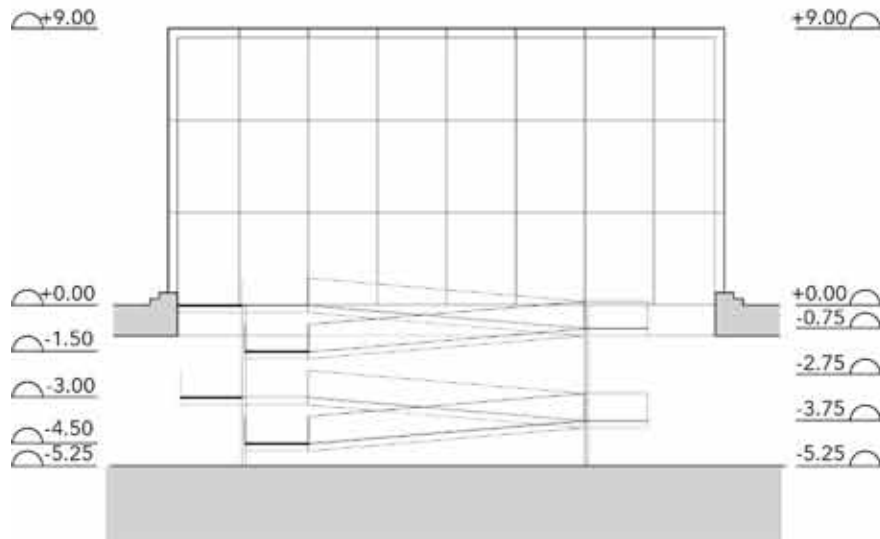
proposed entrance pavilion



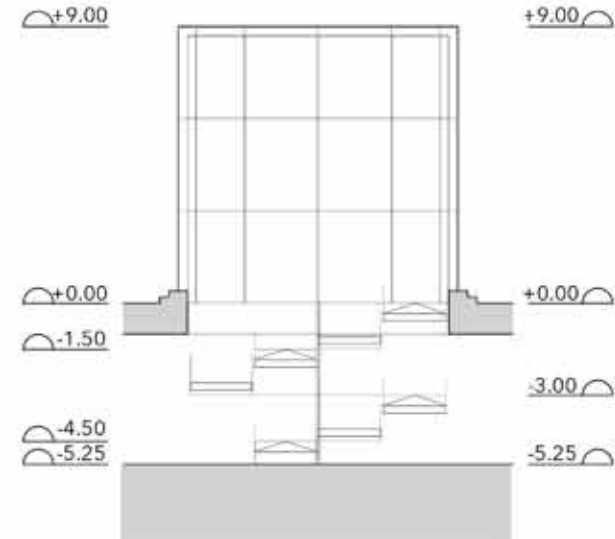
3/058 Section A-A of Entrance Pavilion



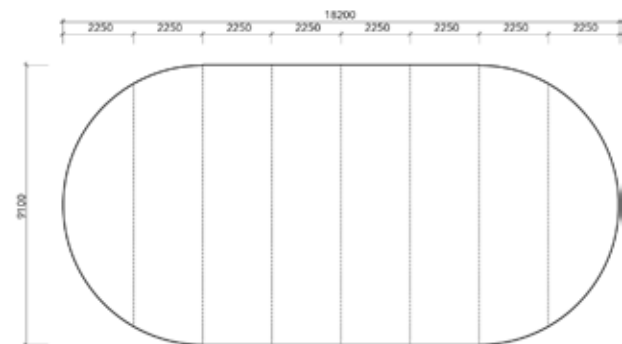
3/059 Section C-C of Entrance Pavilion



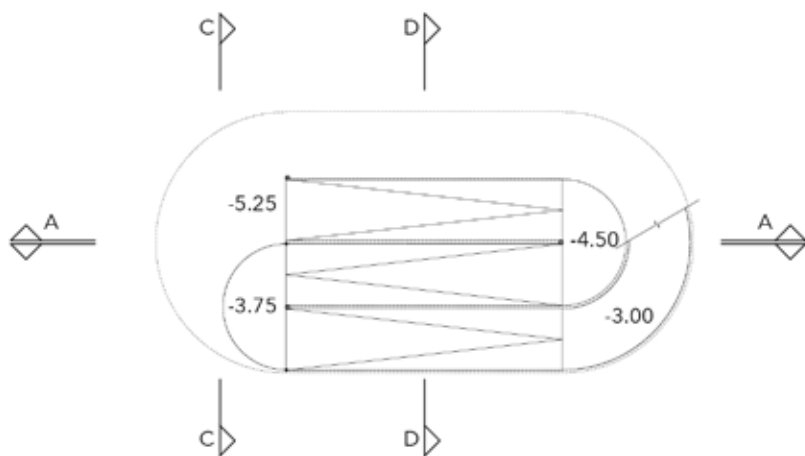
3/062 Section B-B of Entrance Pavilion



3/063 Section D-D of Entrance Pavilion

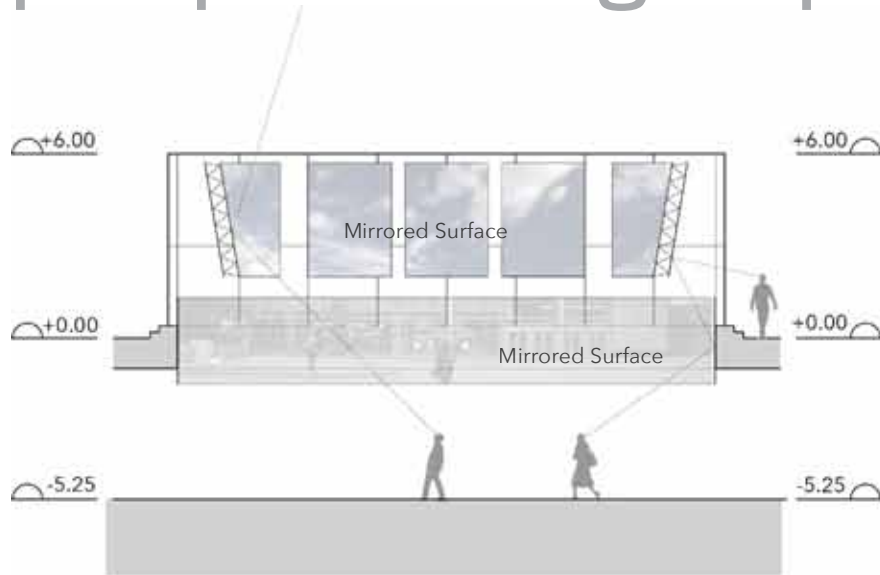


3/061 Roof Plan of Entrance Pavilion

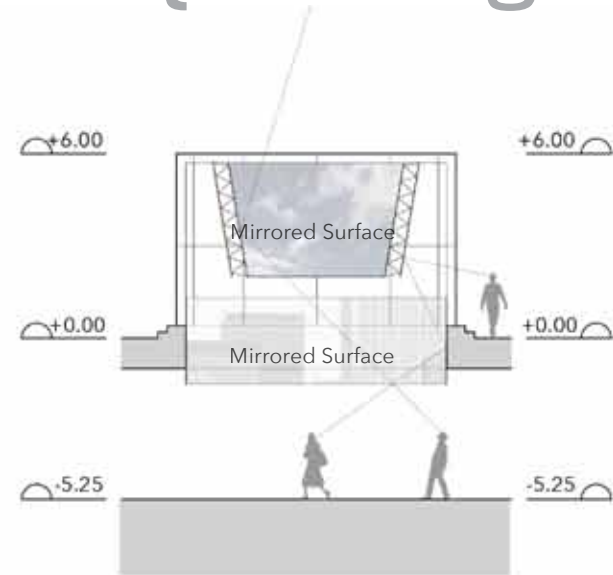


3/064 Concourse Level Floor Plan of Entrance Pavilion

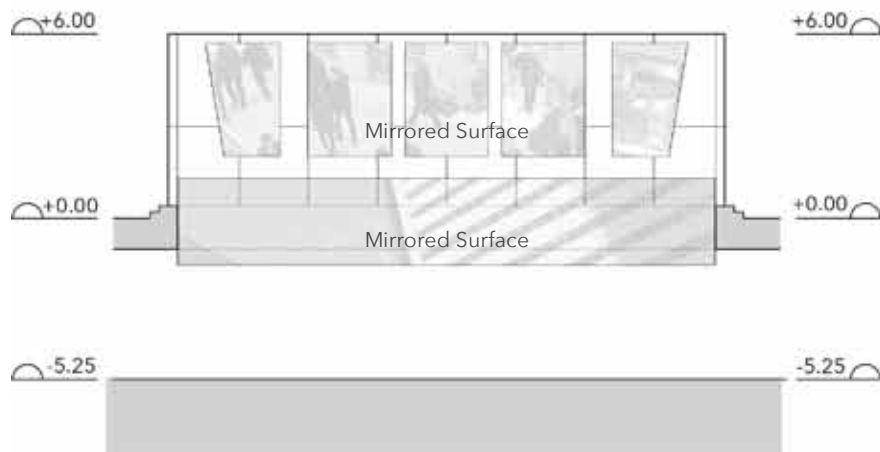
proposed light pavilion (analogue)



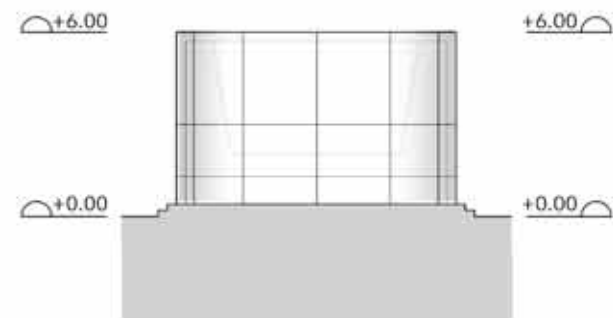
3/065 Section A-A of Light Pavilion



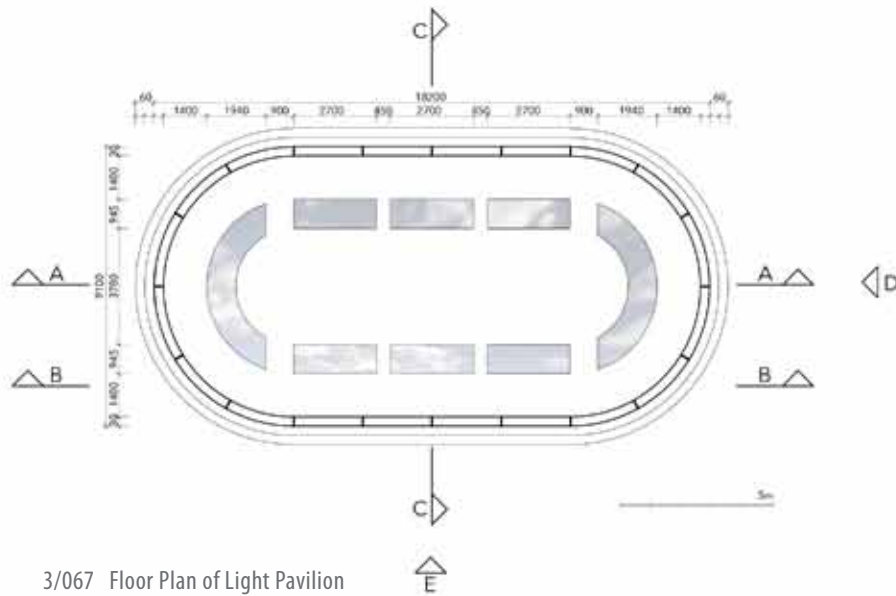
3/066 Section C-C of Light Pavilion



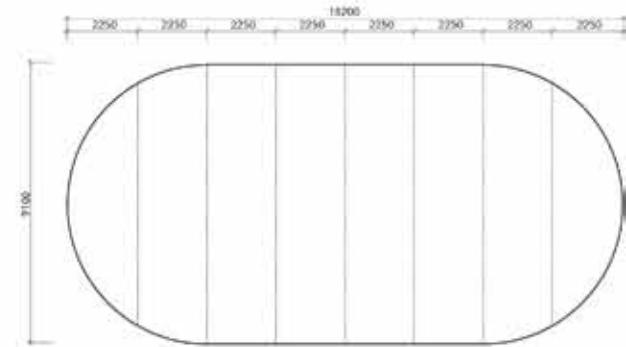
3/069 Section B-B of Light Pavilion



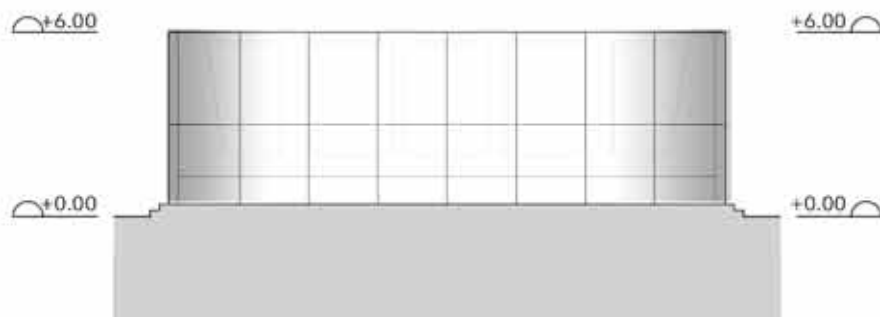
3/070 Section C-C of Light Pavilion



3/067 Floor Plan of Light Pavilion

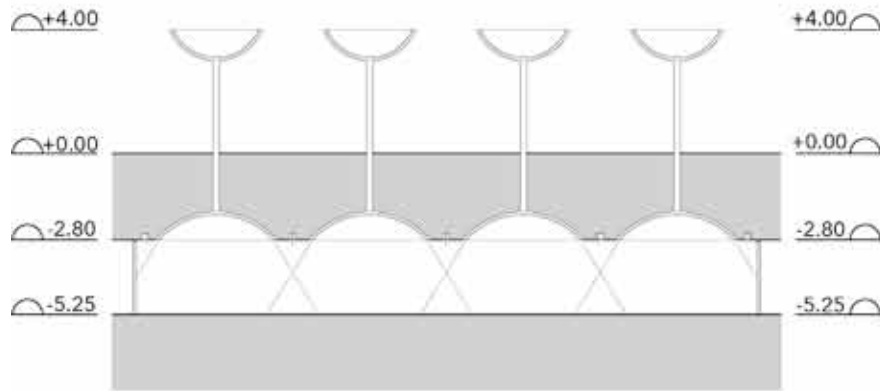


3/068 Roof Plan of Light Pavilion

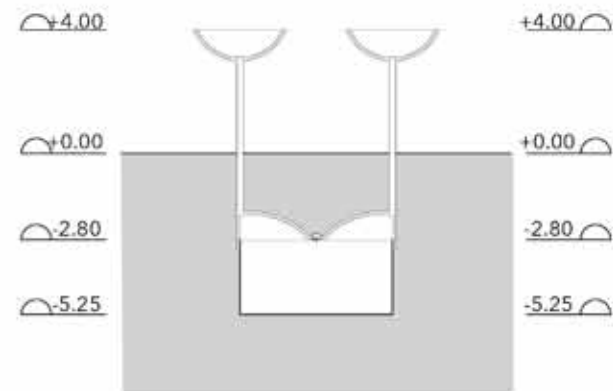


3/071 Floor Plan of Light Pavilion

proposed solar collector tree (technological)



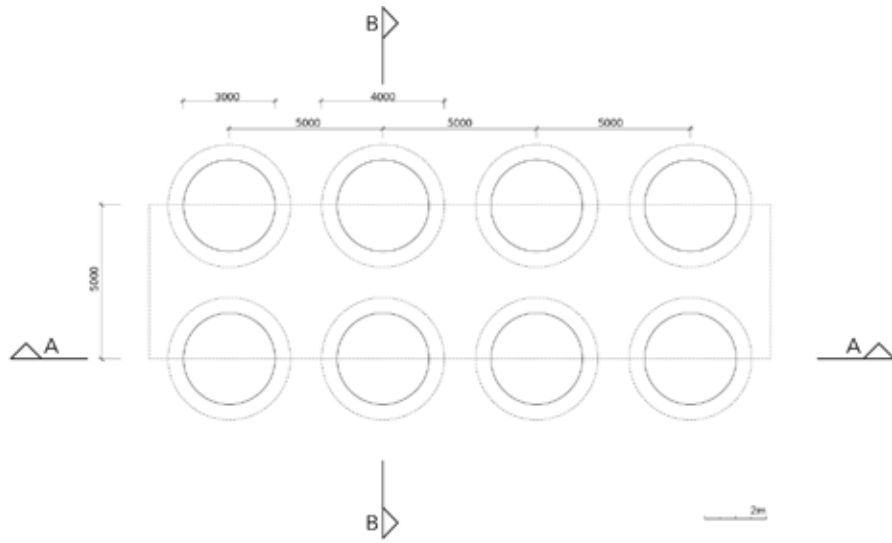
3/072 Section A-A of Solar Collector Trees in a Tunnel Application



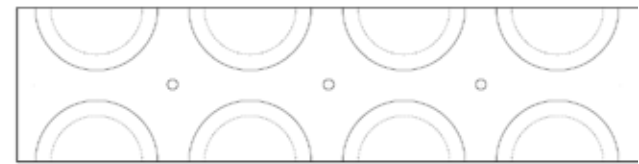
3/073 Section B-B Solar Collector Trees in a Tunnel Application



3/076 Elevation of Solar Collector Trees in a Tunnel Application



3/074 Floor Plan of Solar Collector Trees in a Tunnel Application



3/075 Reflected Ceiling Plan of Solar Collector Trees in a Tunnel Application



3/077 Existing St Andrew Station Site



3/078 Existing City Hall Site

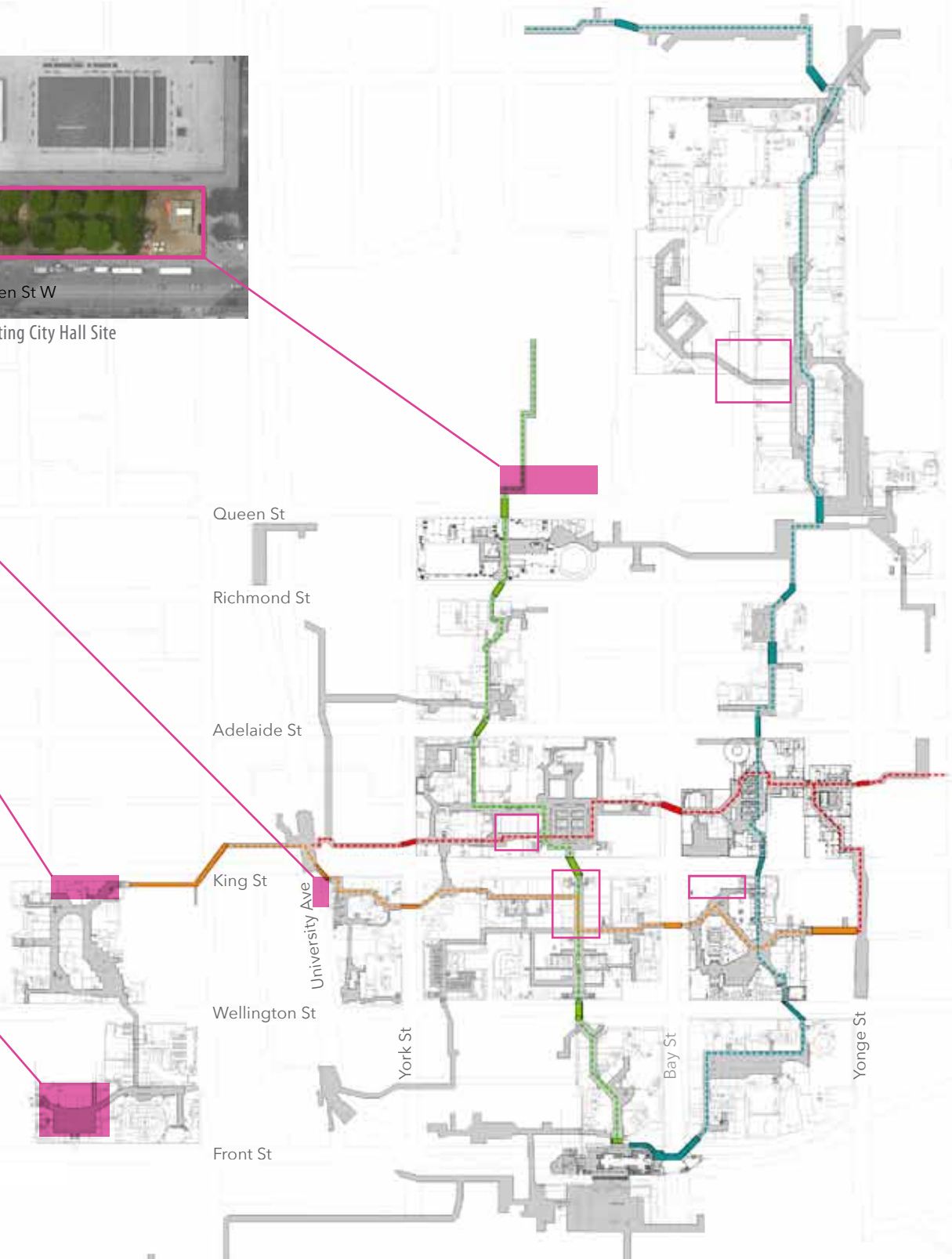


3/079 Existing Metro Hall Site



3/080 Existing Simcoe Place Site

3/081 Key Plan of Proposed Entrance Pavilion Sites



proposed entrance sites

The proposed entrance pavilion is designed with compact dimensions that allow it to fit into any site within the current or future PATH. After analyzing the concourse level floor plans of the PATH in conjunction with aerial photographs of the surface conditions, four sites in the existing PATH were selected as a proof of concept for this thesis. They include: the grassy forecourt of Nathan Phillips Square at City Hall, the northern edge of David Pecaut Square at Metro Hall, Simcoe Park, and the street entrance pavilion to St Andrew subway station.

01. City Hall (Nathan Phillips Square)

Situated on the northwest corner of Queen Street West and Bay Street, Nathan Phillips Square is the public space in front of City Hall encircled by an elevated walkway and with a grassy threshold to the sidewalk. There is an entrance to the underground parking garage on the lawn and a separate PATH entrance on the sidewalk with exposed bicycle parking adjacent to it.

Due to its central location in the city and its position as the terminus of the Union Station Westside Route (green), this site is an ideal location for the proposed PATH entrance pavilion. Not only will the pavilion signal to visitors of the PATH's presence, but the ramp will allow underground bicycle parking.

02. Metro Hall (David Pecaut Square)

David Pecaut Square is the public space between the Metro Centre buildings and Roy Thomson Hall, spanning a full city block with King Street West to the north and Wellington Street West to the south. It is used to host events like the Toronto International Film Festival. Metro Hall is currently the most westerly entrance to the PATH while the adjacent David Pecaut Square has entrance pavilions on the northern and southern edges. These structures

mimic the postmodern style of the Metro Centre buildings and do not have PATH signage.

A proposed entrance pavilion will be inserted at the northern edge of the square to signal a connection to the King Alley South Route (orange). In the future, another one could be placed at the southern edge to connect to Simcoe Place, which will likely be joined with the TMCC and the waterfront portion of the PATH.

03. Simcoe Park

Simcoe Park is bounded by the back of the Ritz Carlton Hotel to the north, Simcoe Place to the east, Front Street West and the TMCC to the south, and the CBC building to the west. Its proximity to the TMCC makes the food court underneath a popular destination, even on the weekends. Currently, visitors can only enter the food court via stairs with higher than standard risers that are not conducive to families and the elderly.⁹

A proposed entrance pavilion will replace the existing stairs and offer a more accessible entry point to the food court.

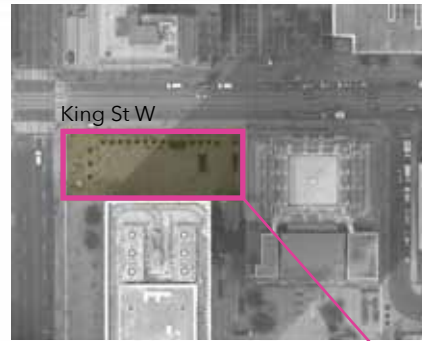
04. St Andrew Station SW Corner Entrance (145 King St W)

Situated at the southwest corner of King Street West and University Avenue is a one-off entrance pavilion in the shape of a glass house marked with the address "145 King St W." A sign on the sidewalk indicates access to the TTC subway, but the staircase inside descends into a food court. The subway is visible only after a hairpin turn. There is no signage to indicate that it is also a PATH entrance.

University Avenue angles off of the rigid city grid, creating pie-shaped sidewalks at its intersections. A proposed entrance pavilion will replace the existing glass house on this generous sliver of pavement, signaling access to the subway as well as to a node in the King Alley South Route (orange).



3/082 Existing Plaza at First Canadian Place



3/083 Existing King and Bay Site

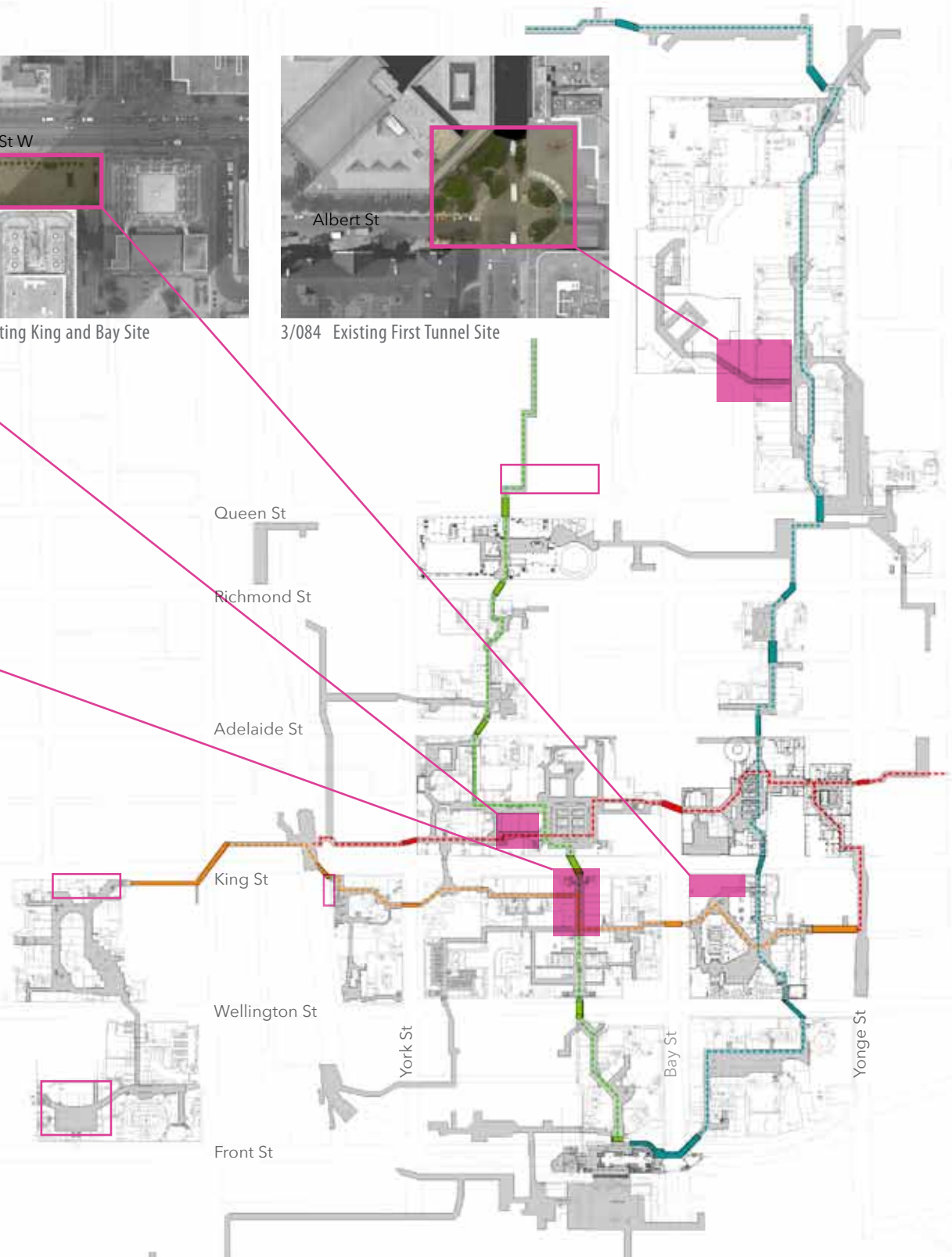


3/084 Existing First Tunnel Site



3/085 Existing TD Plaza Site

3/086 Key Plan of Proposed Light Insertion Sites



proposed light insertion sites

Bringing natural light into the subterranean level is subdivided in two methods. The analogue methods involved physically cutting holes in a surface as in Fünf Höfe or using angled mirrors to render a periscope effect as in The Hotel, transferring views of the street to the underground. The technological methods involved using advanced materials to reflect light as in The Sky Reflector-Net or using a patented solar collector to transfer sunlight as in the Lowline Project.

Four sites were chosen for bringing natural light down into underground spaces. These sites were selected in areas where there is no need for an additional entrance to the PATH and where the surface condition is relatively vacant. Both the subterranean space and the street level would benefit from a vertical connection of natural light.

The two sites selected for the proposed light pavilion are the plaza at First Canadian Place and the TD Plaza, both located along King Street West.

05. The Plaza at First Canadian Place

West of FCP on King Street West is a privately owned plaza with trees and an outdoor seating area with furniture arranged to resemble a food court. With stairs on the north and west edge, this plaza acts as a threshold to the restaurants and food court on the second level of the building. There are also food vendors underneath the plaza.

The plaza sits on top of the junction of two main routes in the PATH: the King Alley North (red) and the Union Station Westside Route (green).

A light pavilion will be placed onto the southwest corner of this site to open up the cavernous space below. Visual connection between the two levels will signal to the people below that there

is seating above while people on the street will see the food vendors below.

06. TD Plaza

On the south side of King Street West diagonally across from the Plaza at FCP is the TD Plaza. Bounded on three sides by iconic Mies van der Rohe buildings, this flat, vacant plaza sits on top of the intersection of two main routes in the PATH: the King Alley South (orange) and the Union Station Westside Route (green). The dark corridor below would benefit from natural light from a proposed light pavilion.

The two sites selected for the proposed solar collector trees are the southwest corner of King and Bay in front of Commerce Court and the The First Tunnel connecting the Toronto Eaton Centre with Bell Trinity Square.

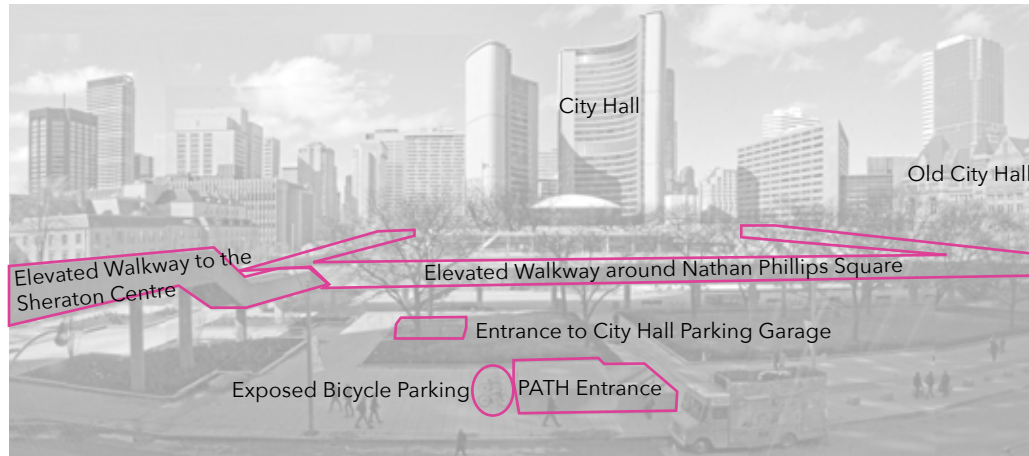
07. King and Bay (SW Corner - Commerce Court)

Directly below the surface of this street corner is a CIBC banking branch. Inserting proposed solar collector trees similar to those of the Lowline Project will allow the concourse banking space to have natural light while creating a more vibrant plaza.

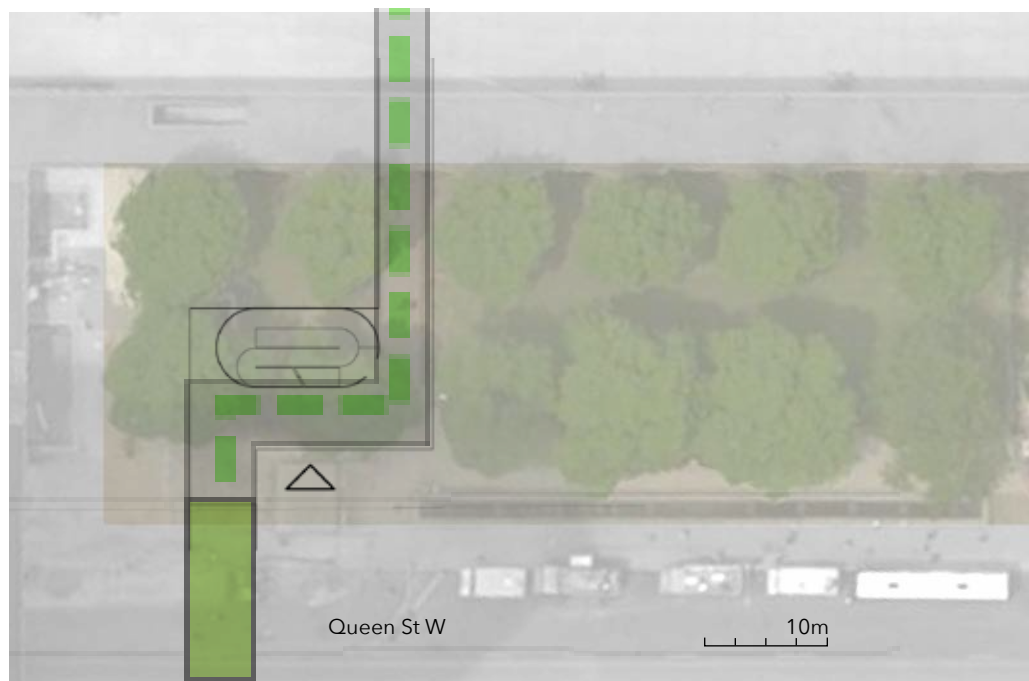
08. The First Tunnel (Eaton Centre to Bell Trinity Square)

The first tunnel of Toronto's underground system is located under Albert Street, currently connecting the Eaton Centre to Bell Trinity Square. Renovated over the years, it is a hidden tributary of the Union Station Eastside Route (blue). To commemorate its status as the first tunnel, a twin allée of the proposed solar collector trees will demarcate its location below the surface and highlight the entrance walkway to Bell Trinity Square above.

01. city hall



3/087 Diagram of Existing City Hall Site



3/088 Site Plan of Proposed Entrance Pavilion at City Hall Site

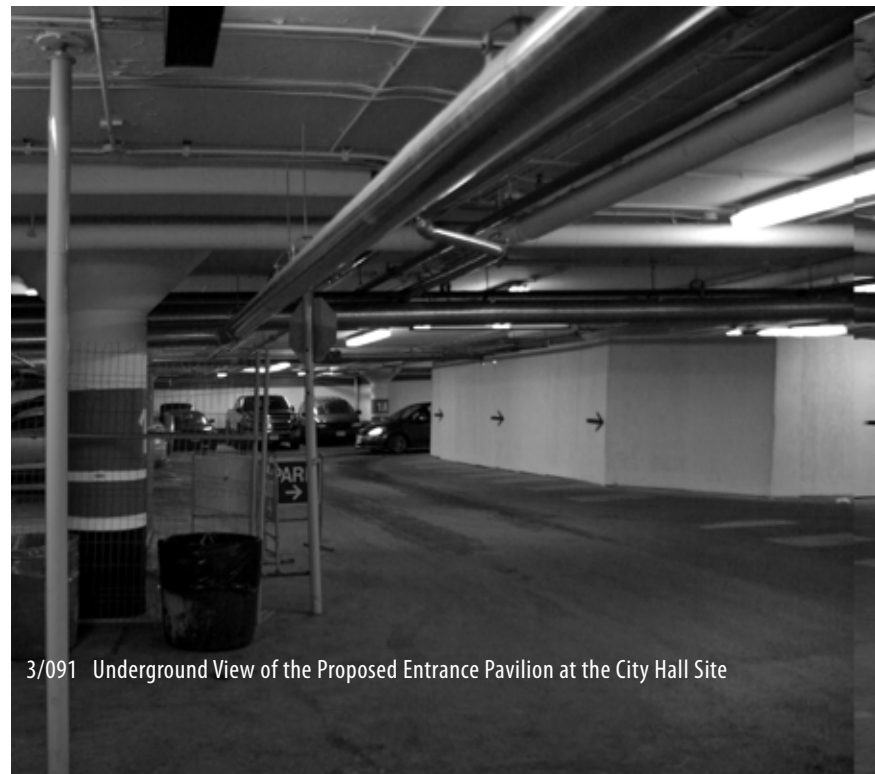


3/089 View of Proposed Entrance Pavilion at City Hall Site





3/090 Aboveground View of the Proposed Entrance Pavilion at the City Hall Site



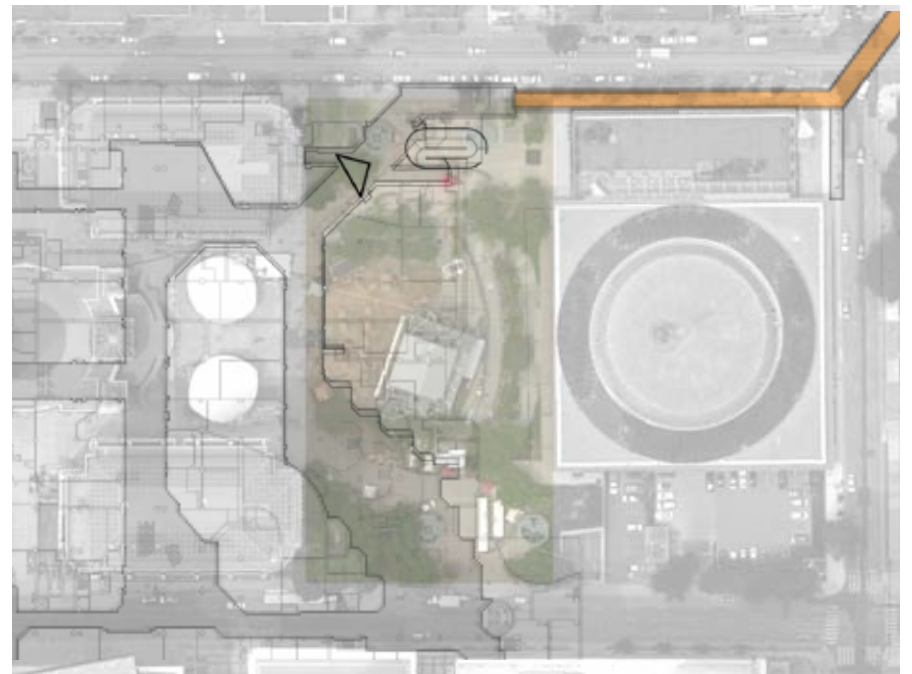
3/091 Underground View of the Proposed Entrance Pavilion at the City Hall Site



02. metro hall



3/092 Interior View of Existing Metro Hall Site



3/093 Site Plan of Proposed Entrance Pavilion at Metro Hall Site



3/094 Interior View of Proposed Entrance Pavilion at Metro Hall Site

03. simcoe park



3/095 Street View of Existing Simcoe Park Site



3/096 Site Plan of Proposed PATH Entrance Pavilion at Simcoe Park Site

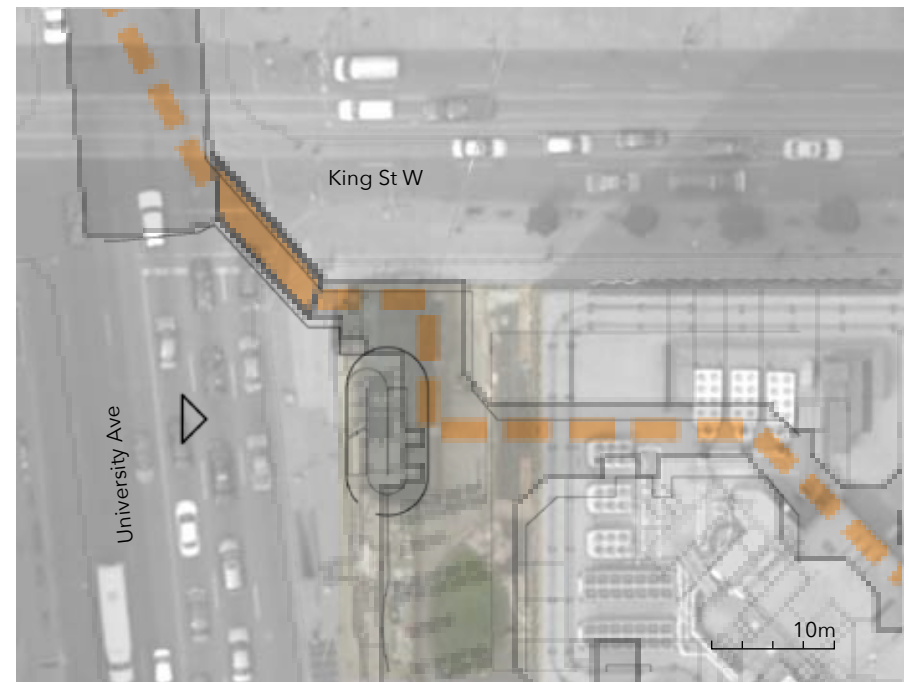


3/097 Street View of Proposed Entrance Pavilion at Simcoe Park Site

04. st andrew



3/098 Street View of Existing St Andrew Station Site

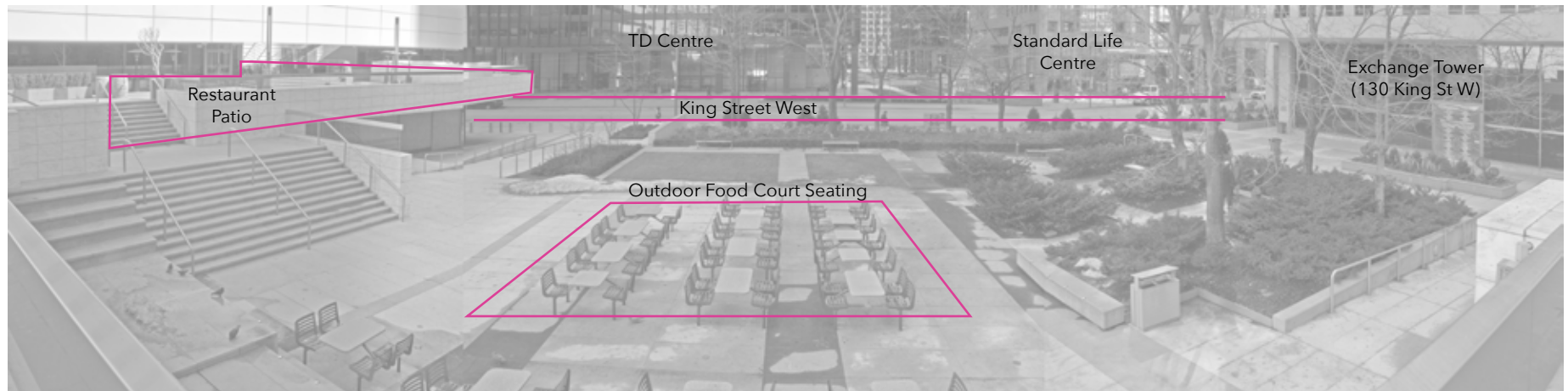


3/099 Site Plan of Proposed Entrance Pavilion at St Andrew Station Site



3/100 Street View of Proposed Entrance Pavilion at St Andrew Station Site

05. plaza at first canadian place



3/101 Diagram of Existing Plaza at First Canadian Place Site



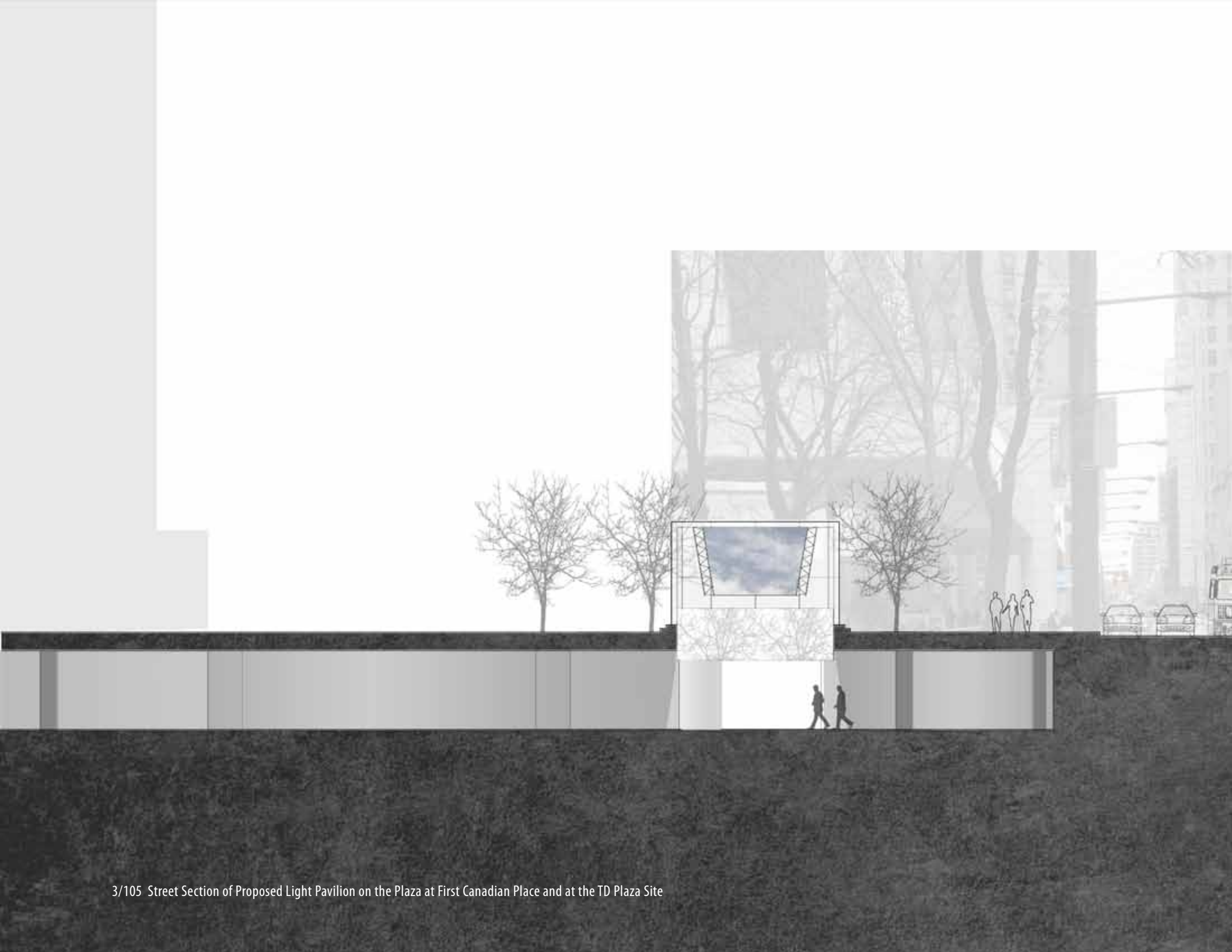
3/102 Site Plan of Proposed Light Pavilion on the Plaza at First Canadian Place Site

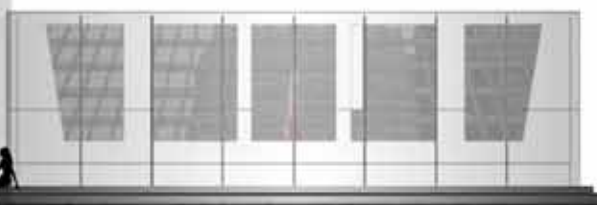


3/103 Underground View of Proposed Light Pavilion at the Plaza at First Canadian Place Site



3/104 Aboveground View of Proposed Light Pavilion on the Plaza at First Canadian Place Site

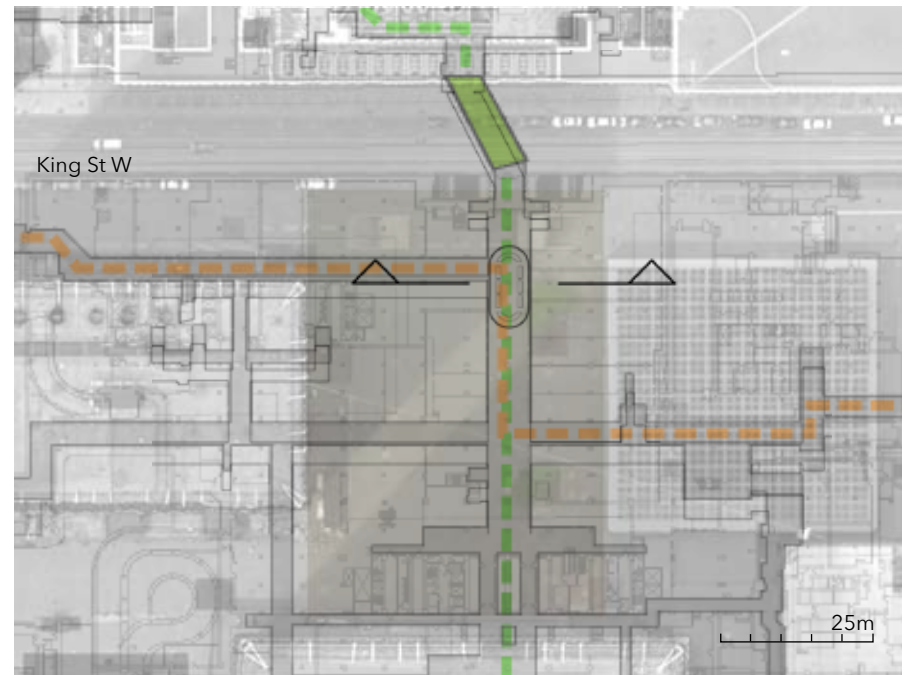




06. TD plaza



3/106 View of Existing TD Plaza Site



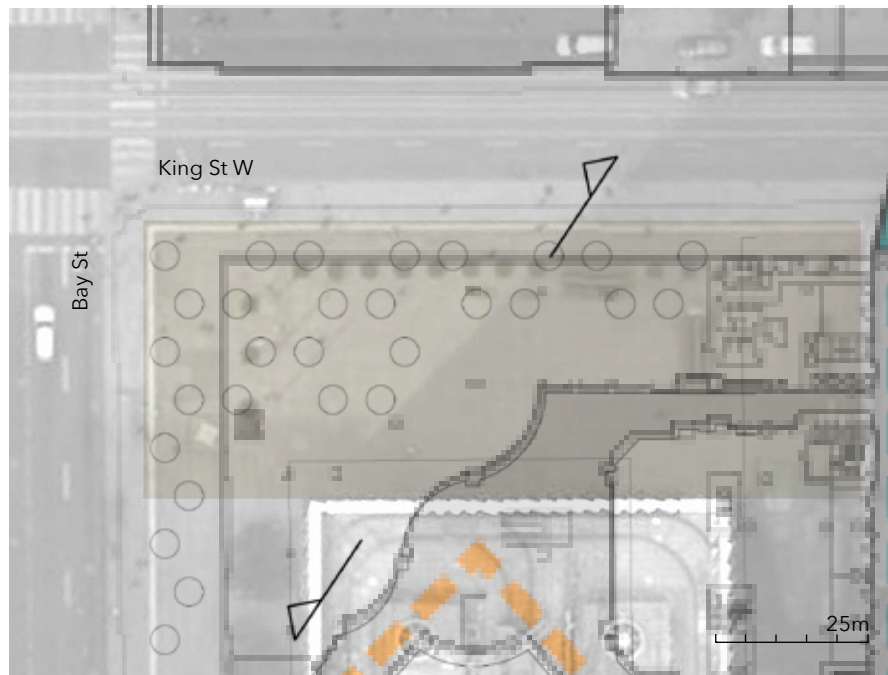
3/107 Site Plan of Proposed Light Pavilion at the TD Plaza Site



07. king + bay



3/110 Aboveground View of Existing King and Bay Site



3/109 Site Plan of Proposed Solar Collectors at King and Bay Site



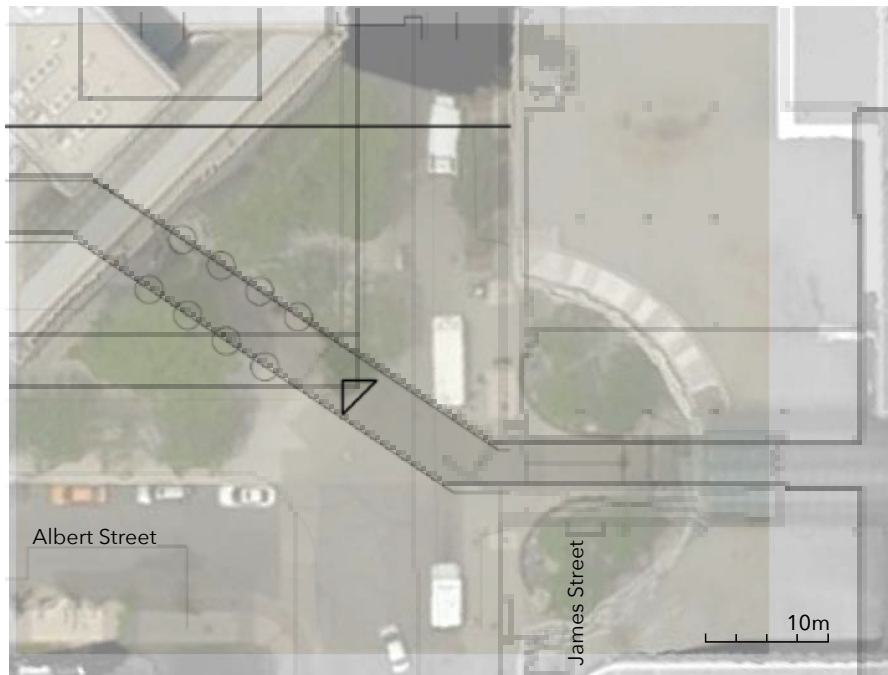
3/111 Underground View of Existing King and Bay Site



08. first tunnel



3/114 Aboveground View of Existing First Tunnel Site



3/113 Site Plan of Proposed Solar Collector Trees at the First Tunnel Site



3/115 Underground View of Existing First Tunnel Site



3/116 Aboveground View of the Proposed Solar Collector Trees at the First Tunnel Site



toward universal accessibility

Architecture is the articulation of space so as to produce in the participator a definite space experience in relation to previous and anticipated space experience.

– Edmund N. Bacon *Design of Cities* 1967

As an underground system, the PATH is often hidden from the world above, making an already confusing system even more challenging to use. Issues with inadequate maps and signage within the PATH documented in the previous chapter are compounded with the lack of natural light, and the invisibility of its entry points limit its usefulness. New and old techniques can be employed to increase accessibility while creating distinct structures aboveground.

Well-designed subterranean spaces around the world were studied, each contributing ideas and strategies to the

improvement of the PATH, with the hopes of seamlessly connecting the spaces above and below ground while maximizing natural light.

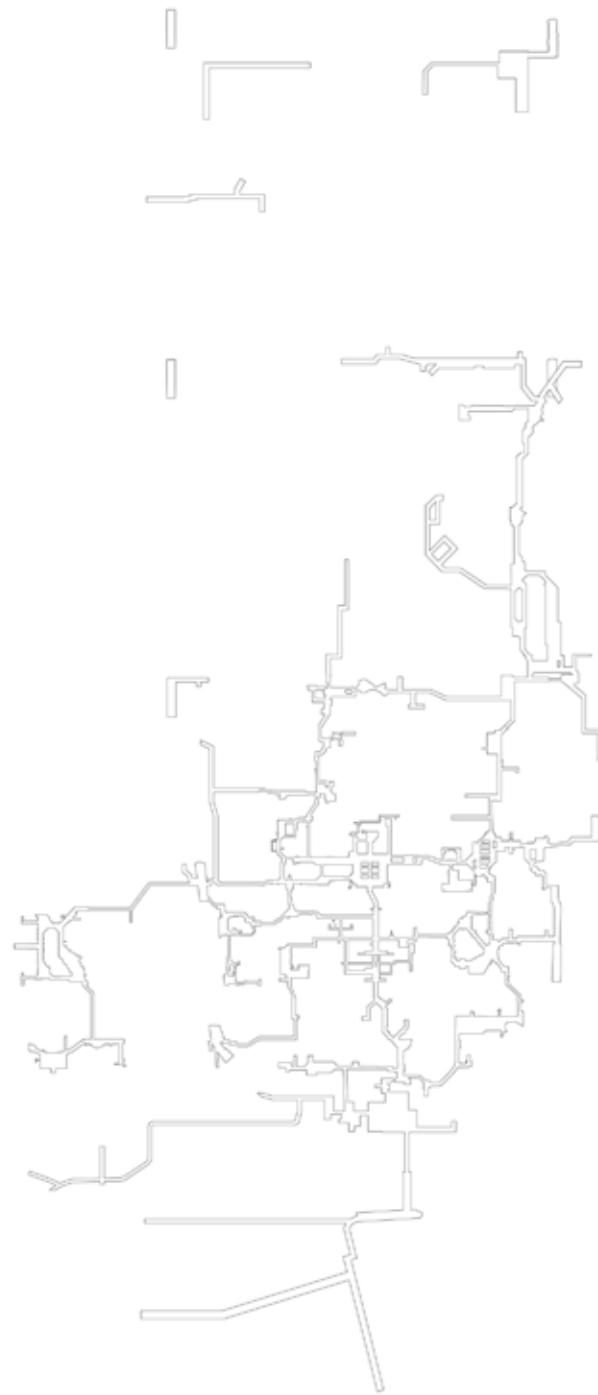
In this chapter, eight sites were selected for the implementation of design strategies that could be multiplied throughout the PATH. The proposed entrance pavilions will create clear access points into major nodes of the PATH, allowing users to easily gain entry into the underground regardless of their previous experiences with the system. Individuals on street level will see these landmarks as consistent signposts for the PATH, increasing their use. Further to such direct connections, natural light gained through analogue and technological means will grant users indirect contact to the outside world. Challenges in navigating the PATH will be rectified with these strategic modifications.

chapter three: endnotes

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8. "Concept" Accessed Feb. 14, 2015, <http://www.thelowline.org/about/project/>
9. One day when I was photographing this site, a family with two parents and two young children were descending the steps behind me. Suddenly, I hear a scream from the mother. A toddler was tumbling down the stairs, stopped by the father's legs, which acted as a barrier to the momentum.







conclusion

As climate-controlled underground passageways lined with stops and restaurants, the PATH should act as an obvious alternative to the congested streets above. In fact, it is hidden from and poorly understood by first-time users; daily commuters who already know the route from the subway station to their office building form the primary user group. The PATH was explored through the themes of expanding, traversing, and surfacing to discover what alterations are required to improve navigation and accessibility.

Expanding

From an underground connection originally constructed for the Timothy Eaton Store in the early 1900s, the PATH has now expanded into a system of tunnels and bridges spanning thirty kilometres. The construction of the subway loop endorsed the popularity of underground connections to buildings in the downtown core.

Visionary city planner Matthew Lawson attempted to guide the locations of the understreet tunnels to reflect the city streets above through policy. His efforts were thwarted when focus of city planning returned to strengthening street level activity under the influence of reformed city planners who followed the tenets of Jane Jacobs, diverting public attention away from the underground. Private enterprise became the driving force for the development of the PATH. Its growth and logic dictated by the self-interest of individual developers. The result is a fragmented underground city that continues to grow and is governed by the economic whims of competing private developers.

Traversing

Within the PATH, spatial orientation is the primary obstacle to its usefulness and convenience as an alternative to the public streets above, as demonstrated by the two navigational experiments. Journeys through the PATH are difficult to replicate in the minds

of users as the tunnels lack identifiable landmarks for information coding within the brain by place cells and grid cells. By using a colour-coded system, with associated sounds, smells and textures, for the main routes, the user's sensory perception will be stimulated, creating a memorable navigation pattern.

Surfacing

Inconspicuous entrances reduce the PATH's receptiveness to potential users from the aboveground. The lack of surface openings prevents natural light from entering the underground and limits visual connectivity of the two levels.

Examinations of successful underground spaces helped inform the design of additional openings into the PATH. The new standard entrance pavilions will give consistent visual cues to users on street level, indicating an access point into the PATH. Located at four key areas within the PATH and prominently placed at major sites downtown, these openings with universal access for wheelchairs and bicycles will allow a wider range of users to weave between the city below and the city above. Four light insertions, two using analogue and two using technological methods, are placed at strategically selected sites. The analogue intervention will visually link the street and underground through reciprocal reflected views. The technological interventions will bring natural light to the subterranean spaces while providing an artificial streetscape that hints at existence of the city below.

The spaces within and above the PATH were critically evaluated, emphasizing the discrepancy between the imagined utopia of a practical public space for relieving congestion and the complicated maze of privately owned tunnels it has become. This thesis has presented simple redesigns that can improve the usability of the PATH, exposing the great potentials that lie just beneath our streets.



epilogue

"Back in an hour, I hope," I say to my colleagues as I drag my feet to the elevator. I have been dreading this day. The time has come to pick up my shoes. I have not entered the PATH since the disastrous experience I had when I went to drop them off for repairs three weeks ago.

As the elevator doors open on the concourse level, I am greeted with a faint scent of citrus. I follow the scent to the tunnel connecting 225 King Street to the subway. Orange lights guide the way. I'm under King Street, entering St Andrew subway station. Here, I'm faced with two choices: the red route to the north of King Street or the orange route to the south of King Street. A prominent map indicates that this orange path will lead straight to the TD Centre.

I pass through two more similarly lit tunnels with the smell

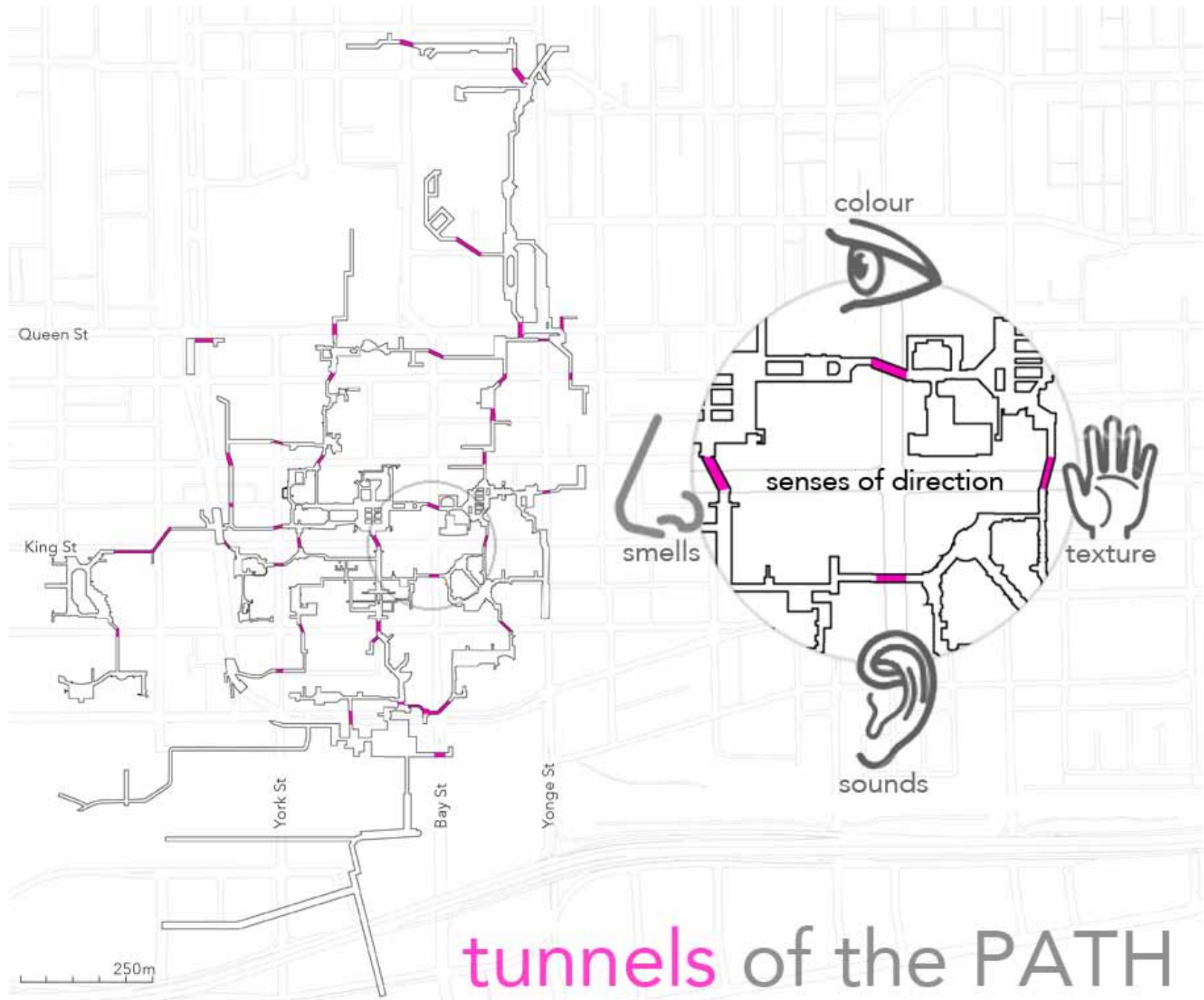
of fresh oranges. And is that the sound of rustling leaves? I'm transported to an artificial world of an orange grove during my underground hike.

I weave easily from building to building, without needing any signs. When I reach the TD Centre, sunlight floods into a major intersection of the corridors. I see the sky and the street level activity, as I get closer to the node. I make a right turn and enter the food court. The shoe repair shop is near. I glance at my watch. Record time.

"Here you go," the shoe guy says as he hands me my shoes.

I relax and eat at the food court, basking in the afternoon sun, before threading my way back through the orange tunnels.

I can't wait to come back tomorrow.



appendix: sensing direction

Underneath the congested sidewalks of downtown Toronto is an expanding underground pedestrian network spanning 30 kilometres. Branded as the PATH, it offers no clear path to any of the destinations it connects. Instead, it is a labyrinth of shopping centres fused together by tunnels. With each shopping centre privately owned by competing developers, the original design intent had been to disorient and trap consumers within their property.

The PATH is a non-place. This means that it may not be special and it may not be pretty, but that there is a lot of it and at the very least, it should be useful.

Since 1987, efforts by the city to render the PATH more user-friendly have been supplanted by the unwillingness of developers to voluntarily maintain common elements such as maps and signage. Inconspicuous street entrances add to the problem, preventing the PATH from becoming a viable alternative to street level sidewalks during the harsh winter months, humid summer days and the odd thundershower.

Most recently in 2012, the city produced a document listing design principles to make the PATH more useable to visitors and

the growing downtown population. These principles are not enforced. Nothing has changed. Navigation remains a challenge. Unless you are a daily commuter who has memorized specific routes, you will get lost.

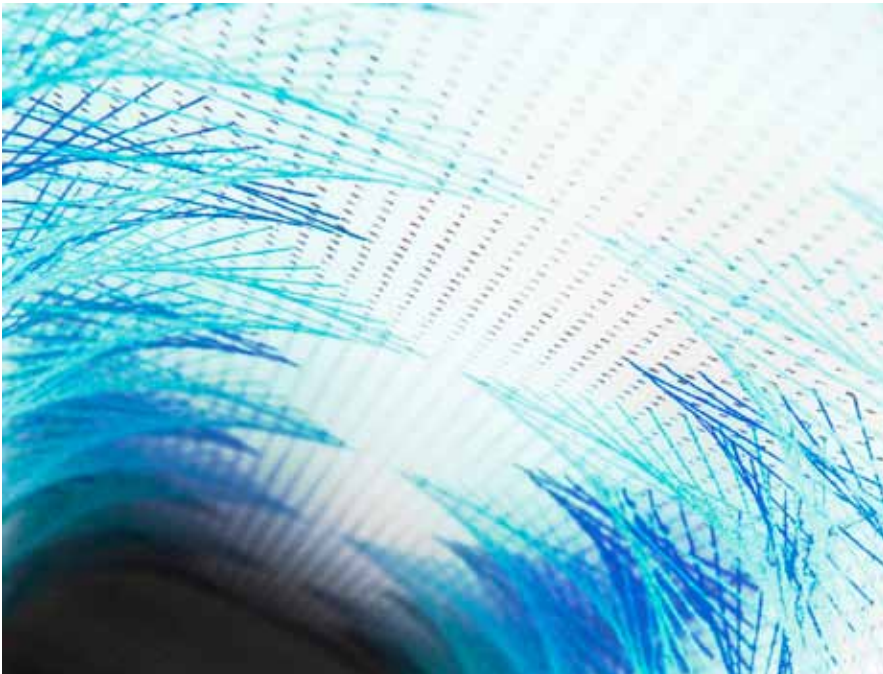
My thesis proposes that the city take a more aggressive approach and reclaim the tunnels as public space. With full control of their design and maintenance, the strategy will be to overload the user's sensory perception at these tunnels and trigger cognitive memory as a method of stimulating spatial orientation.

Colours, textures, sounds and even smells will be infused into the tunnels, creating a memorable navigation pattern, where people can literally find their way by following their senses. Enhanced vertical connections will visually integrate the public streets above with the climate-controlled sidewalks below.

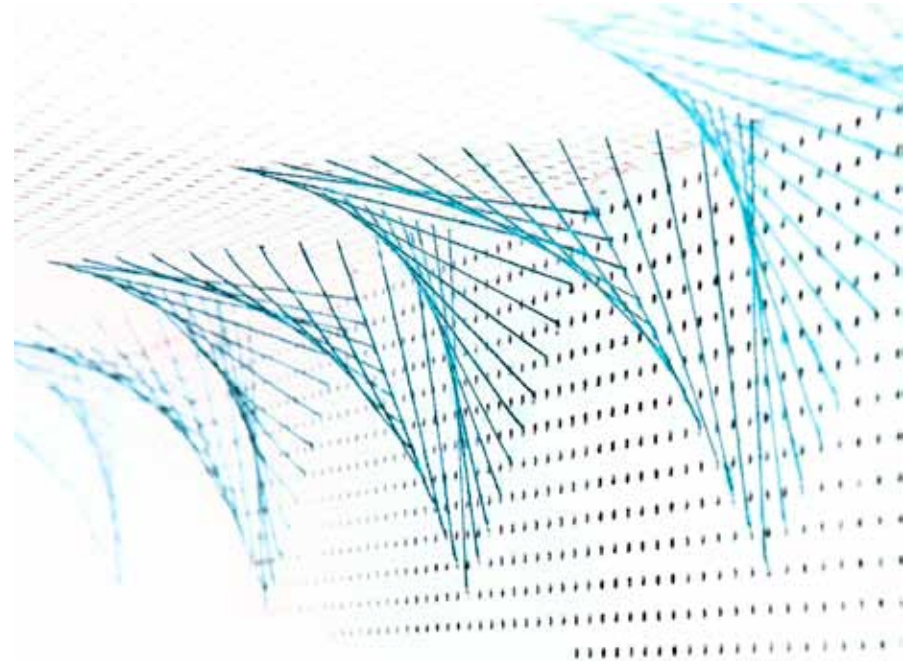
The PATH will always be relegated to the status of non-place. But with these surgical interventions, future users would be able to weave in and out of the PATH, seamlessly traversing Toronto's downtown core.



0/008 Model of Adelaide St W Tunnel, east of Bay - with one layer of thread



0/009 Model of Adelaide St W Tunnel, east of Bay - with three layers of thread



0/010 Model of Adelaide St W Tunnel, east of Bay - one side with one layer of thread

appendix: ariadne's thread

The PATH conjures up maze-like images akin to the labyrinth. The solution to the labyrinth is, of course, Ariadne's thread. Minos, King of Crete conquer Athens and forced their King to sacrifice seven noble men and seven noble women every nine years to the Minotaur who lived in the centre of a labyrinth. Theseus, the son of the King of Athens set sail to Crete, determined to defeat the Minotaur. Upon arrival, Theseus met Ariadne, the daughter of Minos, who fell in love with the Athenian prince and decided to help him solve the labyrinth. Ariadne gave Theseus a ball of thread. He attached one end to the entrance and unraveled the rest behind him as he reached the centre. Theseus killed the Minotaur and followed the thread out of the labyrinth.

Out of this mythology came a thesis project proposal to apply colour-coded thread art to all the understreet tunnels to aid spatial orientation in the PATH underground pedestrian system. The maintenance and operations of a series of permanent thread art installation in such high traffic spaces would be difficult even if a durable material were to be used.

These photographs capture the illusion of architectural volumes created by the weaving of threads in a scale model of the understreet tunnel connecting Scotia Plaza and the Bay Adelaide Centre beneath Adelaide Street West between Bay and Yonge streets.

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